

Osteographia Elephantina;

O R,

A full and exact Description of all the Bones of an

ELEPHANT,

WHICH

Died near Dundee, April the 27th. 1706. with their
several Dimensions.

C.P. 1/2 Millier's

1/6. Dick's Blackmore

Esq. & M.D. To which are premis'd,

1. *An Historical Account of the Natural Endowments, and several wonderful Performances of Elephants, with the manner of Taking and Taming them.*
2. *A short Anatomical Account of their Parts.*

And added,

1. *An exact Account of the Weight of all the Bones of this Elephant.*
2. *The Method us'd in preparing and Mounting the Skeleton.*
3. *Four large Copper Plates, wherein are represented the Figures of the Stuff'd Skin, and prepared Skeleton, as they now stand in the Publick Hall of Rarities at Dundee; with the separated Bones in several Views and other Parts of this Elephant.*

In a Letter to Dr. *HANS SLOANE*, Fellow of the College of Physicians, and Secr. R. S.

By *PATRICK BLAIR*, M. D. F. R. S.

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THE PHANTOM

WHICH

is a weekly publication, containing a full and complete account of all the news of the day, with many interesting and valuable articles.

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The paper is published every week, and is a valuable source of information for all who are interested in the news of the day. It is a well-known and respected member of the community, and who has been engaged in the publication of this paper for many years.

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T O

Dr. JOHN ARBURTHNET,

Physician in Ordinary to Her Majesty, and Fellow of the
College of Physicians, and of the Royal Society.

HONOURED SIR,



SINCE the Reasons which induc'd me to write the following Treatise, and grateful Obligations which engag'd me to direct them to my Ingenious and Worthy Patron Dr. Sloane, fully appear in the beginning of these Papers: I need not repeat them, neither shall I detain you from their perusal, by shewing what is to be expected in them.

All I here presume to Acquaint you with, is, that being lately inform'd, Mr. Leewenhock has been pleased to favour the Society with some Observations he has made upon the Live Body of this very Species, which afterwards, when Dead, became the Subject of the following Enquiries, I have laid hold on this Opportunity to inform you here for his Account and mine agree, and wherein they disagree.

The first Thing he takes Notice of, is the Situation of the Orificium Philosoph. Vaginae, and of the Coitus, whereof I have discours'd at large. He Transact. seems to favour Tavernier's Opinion, as to the Coitus, which differs No. 336. from what Aristotle and Others affirm, and which from the Articulation, P. 510, &c. I think may be probable, but both these contradict Dr. Moutin's Opinion, that this is a retrocious Animal.

His Second observation, that the Old Elephant sucks her self, and conveys her Milk into the Mouth of the Young One seems to be curious, but lyable to this Objection, that if it is not practicable for the Young One to suck, because of the Proboscis, no more is it for the Old.

His Third observation, about the Structure of the Seab is the same Philosoph. made by a Microscope, with what Dr. Moulin's and I discover'd by the Transact. Inspection of the naked Eye, only he observ'd more Hairs, and no won- No. 326. der, since he made use of so subtille an Assistant. He and I seem to dis- P. 60. &c. agree as to the use of the Humour contain'd in the cutaneous Papillæ, and of this for whereas he asserts that it serves for Nourishment of the Hair, I think I may with as great Probability affirm, that they are excretory Ducts, Treatise P. 18. and or Receptacles, which receive and contain the Humour to be perspir'd, P. 20. when by a too great Constriction of the Pores, the Particles cannot so easily evaporate, and I think the Favæ mentioned in the Cuticula, whereunto these Papillæ were compacted, and the Depressions in the Cutis proceeding from the collaps'd Sides of the empty Papillæ in the now dryed Cutis, are a Demonstration for this Opinion, to which I shall further add, the Loose Vagina which accompany'd the Hair from the Cutis through the Cuticula, by which the Humour might in great Measure have been perspir'd, and

D E D I C A T I O N.

I think that Opinion not ill Founded, that the Scabs are occasioned by a grossness and viscosity in the Blood, the motion of whose Particles (which transpire) are inhibited by the Air in these Cold Climates, and thus they adhere to each other till at length they appear under form of a Scab. Their being so subject to Sweating in the Hot Countries, where there is such Care taken to remove these Particles by rubbing the Skin, and to keep the Pores open, by anointing with Oils, and so to promote the Transpiration, may be a sufficient Proof of this.

He seems to take no Notice in the fourth Place of the Capillary Vessels, I alleged to have been in the Cuticula, whereof I have in sundry Places by the naked Eye observ'd so pretty disjunctions of the Branches, that I have no Reason to doubt of it, and I think this seems to have proceeded from the small Part of the Cuticula he was pleas'd to examine.

As to the Five, Six or Seven Persons mentioned in his Page 2. which as I observ'd center in the Pore through which the Hair passes, and thus we seem both to agree. There is nothing indeed I regret more, than that such a rare Subject should have fall'n in my Way, when the Inconveniences of Time, Season, and Place, depriv'd me of the Opportunity of paying so far into it as my Inclinations led me.

I cannot, Sir, but be an extream Satisfaction to the Learned, to see you in so Eminent a Station, that as you are most capable to judge of Learning and Literate Persons, so you are always willing and ready to promote their Interest. Her Majesty's late Gracious Order was to instruct her Ambassadors and Envoys abroad, that they may make Enquiries after whatever may improve and Advance the Experimental Philosophy and Natural History, whereby to encourage the Royal Society, and give the said new Life and Spirits to so many Famous and Learned Persons in that Kingdom. And since it has pleas'd that Illustrious Body to receive me into the Number, I shall ever look upon it as an indispensable Duty incumbent upon me to exert my utmost, whereby to render my self Worthy of so great an Honour. And I must take the Freedom to put you in mind, that as this our Learned Body are busied in receiving Discoveries and Improvements from all other Parts of the World, so to pity our Native Country Scotland, so considerable a Part of the now United Island, should be so much neglected for want of knowing Persons and a suitable Genius, as of due Encouragement to set their prying and penetrating Spirits in Motion.

Sir, please to Accept the following Shirts, as a Testimony of my Respect, which as the Royal Society have already been pleas'd to favour with their Countenance, so I doubt not of your favourable Reception also.

Long may you Live, Prosperously may you go on in the Advancement and Improvement of Learning, and may Success in all your Noble and Vertuous Endeavours attend you, which is the warmest Prayer, of

London, Sep-
tember 15th
1713.

Honoured SIR,

Your most humble Servant

PATRICK BLAIR.

Osteographia Elephantina:

O R,

A full and exact Description of all the Bones of an *Elephant*, which died near *Dundee*, *April* the 27th, 1706. with their several Dimensions. Communicated in a Letter to Dr. *Hans Sloane*, R. S. Secr. By Mr *Patrick Blair*, Surgeon, &c.

S I R,

THE *Elephant*, tho' an Animal so considerable for its Bigness and Strength, so remarkable for its extraordinary Endowments and stupendous Actions (if I may so call them;) that it has become the Subject of the most Curious Naturalists of all Ages, and been admir'd by all those who beheld it; yet has its Body been hitherto very little subjected to Anatomical Enquiries. This induc'd Me (when upon *April* 27. 1706. the last *Elephant* that was in *Britain* died near this Place) to bestow some Pains in viewing its Parts at the Opening: But the Time was so short, and Inconveniencies I labour'd under so great, that I was doubtful, whether what I had observ'd might prove worth your Own or your honourable Society's while, until I had address'd your self, and you were pleased to honour me with a return dated *July* the 11th following: Wherein you signify'd, ' You were glad the *Elephant* had fall'n where Notice might be taken of its Parts by Dissection, and that the Bones would be well worth Observation, for several Reasons; but chiefly one, namely, that there have been large Bones, supposed to be those of *Elephants*, found many Feet deep in the Ground, and that if there were a Sceleton to compare them by, that matter would be more certain: And there-

Preface.

B

'fore

fore (tho' I had told you in mine that I was able to make but few of them) you desired me to let you have my Observations. The better to enable me to do which, you favour'd me with two Treatises on *Elephants*, which I suppose to be the only Two hitherto communicated to the *Royal Society*; one whereof gives an Anatomical Account of the *Elephant* accidentally burnt in *Dublin*, Anno 1681. written by Dr. *Moulins*; which, tho' it requires a further Enlargement, being very brief both in the Anatomy and Osteology, and the Figures not very exact, yet seems to have been the only Book which undeceiv'd the Author of the other, viz. *Wilhelmi Ernesti Tentzelij Historiographi Ducalis Saxoniae Epist. de Sceletio Elephantino, Tonnae nupr effosso, ad Anton. Magliabechium magni Ducis Hetruriae Bibliothecarium*. This is the Treatise which describes the Bones mention'd by you, found in an Hill near *Erfurt* in *Germany*; wherein the Author earnestly intreats, 'That tho' by distance of Place he cannot expect from his Friend such a Figure of the *Elephant* at *Florence*, (as *Cyampinus* formerly obtain'd) yet, that he would, as exactly as possible, take the Dimensions of all the Bones, especially of the Head, Teeth and Tusks, their Number, Situation and Origin; and he desires further to know, how old that *Skeleton* at *Florence* was, how high, and when it was dissected.

Therefore, Sir, in Obedience to your repeated Request, in the several Letters you were pleas'd to Honour me with, and finding the Author of the last nam'd Treatise, has favour'd the Repository of your Society with several Specimen's of the Bones he describes, some whereof perhaps being broke, may come not to be so well known; that I may satisfy you to whom I am so much bound, for the many special and signal Testimonies of your Favour, your honourable and learned Society, for whom I have so great a Veneration and Respect, and to whom I shall be extreamly glad, if by these means I may be capable to do any small piece of Service, and the Learned *Tentzelius* in that he so earnestly desires, and wherein I do not yet understand his Friend has answer'd him: In a word, that I may satisfy the World in such Things as were of Moment in this rare and curious Animal, I shall observe the following Particulars, &c.

The Method
of Procedure;

1st, Shew, how the *Elephant* fell in our way.

2^{dly},

2dly, Remove some mistakes which have been entertain'd, concerning its Original Names in the Holy Scriptures.

3dly, Give a short Historical Account from Authors of the several Natural Functions and Automatical Performances of this Animal, with the Method of taking and taming it.

4thly, I shall give such a Superficial Anatomical Description of its Parts, as the Inconveniences I labour'd under at the opening would permit.

5thly, I shall give an exact Description of all its Bones, such as is usually given in Treatises of *Osteologie*, with a particular Account of the Dimensions of these in this Subject.

6thly, A true Account of their Weight and Number.

7thly, The Method I us'd in mounting the Skeleton.

To all these I have added the Figures of the stuff'd Skin, mounted Skeleton, separated Bones in different Views, and other Parts of this Animal; all done from the Original, (and represented in several large Copper Plates) as it now stands in the Hall of Rarities in this Place; the Copy whereof the *Royal Society* has been already pleas'd to approve, as intimated in yours to me in June last.

After this Animal had travell'd most part of *Europe*, she came at last to this Kingdom; where, after some stay at *Edinburgh*, they conducted her to the *North*, and in their return came along the Sea-Coast; where being but few Places on the Road for making Advantage, by long and continued Marches they hastned hither; and when they were come within a Mile of this Place, the poor Beast, much fatigu'd and wearied, fell down. They us'd many Endeavours to get her on foot again, but they all prov'd ineffectual. At last they digg'd a deep Ditch, to whose Side she might lean, till she were sufficiently rested; but that proved her Ruin; for shortly afterwards there fell great Rains, which fill'd the Ditch with Water: So that after lying in the puddle a whole Day, she died next Morning, being *Saturday April* the 27th 1706. When the Keepers saw that she was Dead they came to the Ma-

Sistrates of this Burgh, and having made Oath they had done her no designed injury, they got an Attestation accordingly, and went off, having first given the Cadaver to an Ingenious Gentleman, Capt. *George Yeman*, since Provost of this Town; by whose Care the People were prevented from carrying it all away in pieces, as they did one of the fore Joints, and we still continue Masters of the Remains; for the Day she di'd, he was pleased to go out himself, and take me along with him, in order to have the Skin flea'd off, which was his chief design, and the Body opened, which was mine. As I was very glad of the Opportunity, so I was concern'd because of the disadvantage I was at, which kept me from prosecuting what I design'd: For there went out a great Multitude, the Day was very hot, and being the last Day of the Week, the Subject could admit of no delay, especially since it lay in the high Way and open Fields: So that I scarce had any convenience to pry into, or so much as to see any thing of moment, much less to enquire so nicely into the Structure of the Parts, as the Subject requir'd. 'Twas One of the Clock in the Afternoon before all were in readiness to go out, and most of the time was spent by the Butchers in fleaing off the Skin. All I got done, was to take such narrow Inspection of the Muscles of the *Proboscis*, (or *Promuscis*, as some call it, in *English* the Trunk) as I could. Afterwards I caus'd the *Abdomen* to be open'd, and then the *Thorax*, and that by the unweildy Hands of unruly Butchers, who at opening the first, would have wholly cut through the *Ossa Innominata*, had I not hinder'd them; and at last, whether I would or not, did so slash the *Sternum*, and mangle several of the *Cartilages*, as to render them useles, cutting and tearing where soever they came. I had not much above an Hour to bestow when Night came on, and that amidst a Throng and Rabble in mighty hot Weather. During that time I view'd the Situation of the *Viscera*, took the Figure and Dimensions of the *Liver*, extracted the *Uterus* and *Bladder*, and caus'd the *Head* to be cut off, which (with some other Parts I design'd to have dissected) were brought to Town. I had a mind to be more fully satisfy'd about the *Intestines*, *Spleen* and *Kidneys* on Monday; but when I went out again, the *Intestines* were all dry'd by the Heat; so that their Figure and Structure were quite spoil'd, and the Country People were so earnest to have Parts of it, that they had stole away the whole fore Foot before that time; which, after much Pains and the earnest Care of Provost *Yeman*, we recover'd about 6 Weeks after-

afterwards : So that the time I design'd to have bestow'd in Dissecting the Parts I had reserv'd, was taken up in excarnating, boyling, and taking care of the Bones ; which, had not some Physicians and Surgeons gone out and assisted me on the *Monday*, had been all carried off ; and the heat of the Weather was such that the other Parts would not keep. This, I hope, will be a sufficient excuse for the Lameness of the following Account.

Because the Names given to the *Elephant* in Holy Scripture have been much mistaken, tho' perhaps it may seem forreign to my Business, yet I hope 'twill not be displeasing, if from Authors I endeavour to clear them. *Junius* and *Tremellius*, *Franzius*, &c. who comment upon the 40th Ch. of *Job* v. 15. and downward, take the *Behemoth* for the *Elephant* ; but others, such as the Learned *Bochart*, *Par. 2. lib. 4. c. 15.* and from him *Dr. Patrick*, are of Opinion, 'tis not the *Elephant* which is meant there, but the *Hippopotamos*, or River Horse ; for *Buxtorf* and such others as are acquainted with the Original, agree, that the Word *Behemoth* does not properly signify any thing more than a great Beast ; and both in *Job* and *Esdras*, 6 Ch. v. 49. (where the *Behemoth* is translated *Enoch* in the *English Bible*) the *Behemoth* and *Leviathan* are nam'd together. *Esdras* makes them the Work of the Fifth Day, wherein *Fishes*, other Sea Animals, and Sea Fowls were created ; by which not the *Elephant*, but the *Hippopotamos* may be meant, which *Bochart* proves by the following Arguments. 1. As in *Job* 39. Land Animals, such as Quadrupeds and Fowls, are spoken of ; so in the 40 and 41. *Behemoth* and *Leviathan*, as belonging more properly to the Water, are treated of. 2. The Force of the *Behemoth* is said to be in the Navel of his Belly, whereas 'tis the softest part of the *Elephant* ; but in the *Hippopotamos* it is so thick and impenetrable, that it resists both Spears and Darts, which he abundantly proves from Authors. 3. The *Behemoth* is said to move his Tail like a Cedar ; now the Tail of an *Elephant* is long like that of an Ox, and but small in proportion to the Body ; and to move like a Cedar, would import some strong round substance, and rather seems to agree with what *Bellonius* affirms of the *Hippopotamos*, that *Caudam habet brevem, crassam & rotundam*, tho' *Bochart* renders it *Retorquet. & non arripit Caudam*, as *Junius* has it. 4. *Bochart* says, that the Word in the Original will not imply *Nervis Testium ipsius*, as *Junius* has it, but *Nervis Femorum &c.* Not the Sinews of his Stones, but the Nerves of his Thighs are intricate. 5. The *Elephant* seldom lies down, and never in the

The Behemoth in Job is not the Elephant.

the Covert of Reeds and Fens; for tho' it loves Water very well; yet it would be very hurtful to such an unweildy Animal to lye down among such moisture as Reeds usually grow in, or the being among the Willows of the Brook would import. 6. At the taking of an *Elephant* they never pretend to ensnare it by the *Proboscis*; and when taken it is a most decile Creature, it being more compatible for the *Hippopotamos* to pass through Snares: The usual way of catching it being in Nets made of Iron, which they make on purpose at *Damascus*, as *Albertus* and *Vincentius* affirm; and when taken, is no ways managable, but they are forc'd to kill it with Iron Mallets, because of the thickness of the Skin. 7. Tho the Bones of the *Elephant* be proportionably big enough, yet they are far from such Strength as to make a Parallel between them and Brass or Iron; for they shall be shewn hereafter to be more porous than the Bones of most *Quadrupeds*: And although their Tusks and Teeth may be said to exceed all other Bones in Solidity and Whiteness, yet I am assur'd, that the Teeth of the *Hippopotamos* doth even exceed them; for the Ivory of an *Elephant* after some time becomes Yellow, and the Teeth of the *Hippopotamos* when apply'd to any use, continue always of a pure white Colour.

The different
Names of the
Elephant.

An *Elephant* in the *Syriac* and *Arabic* is *Senhab*, but in the *Chaldaic* and later *Hebrew* 'tis taken for *Elephant's Teeth*, because *Sen* in the *Hebrew* signifies a Tooth. Hence it is, that *1 Kings, Ch. 10. V. 22.* 'tis rendred by *Junius*, &c. *Ebora, Semias & Pavones, Ivory, Apes and Peacocks*, in our Translation; where *Senhab* is rendred by the later *Hebrews*, *Dentes Elephatorum*, but by the *Syrians* and the *Arabians*, *Elephantos*; and therefore *Bochart* thinks it should rather have been *Elephantos, Simias & Pavones*: First, because of their better Coherence; and secondly, because *Ivory* would not have been *Senhabim* in the Plural Number, but *Senhab, Dens Elephantis*; for *Ivory* is denoted elsewhere in Scripture by the Word *Sen*, as *V. 18.* of that same Chapter, where 'tis said, *Solomon* built a great Throne of *Ivory*. *Sendephil* also in the *Chaldaic* Phrase is taken for *Ivory*; for *Phil* signifies an *Elephant* both in the *Syriac, Chaldaic* and *Arabic*. An *Elephant* in the Ancient *Hebrew* was call'd *Alikhaban*, and by Contraction *Alkaban*, that it may be distinguish'd from *Ikhaban*, which signifies a Buffle or Bugle, because both are of that Colour: So *Bochart* conjectures, that *Sen* being prepon'd to *Kahab*, may by Contraction be call'd *Senhab*, which by a *Synecdoche* may mean the whole *Elephant*.

Elephant. In *Greek* it is call'd, *Βλέπας*, and sometimes *Βουφί*, which is rendred *Bos Martius*, whereby they mean the *Elephant*. In *Latin* 'tis call'd *Barrus*, from the Voice; or some think that *Barrus* is the proper Name, as in *Horace* — *Nigris dignissima Barris*; *Hor. Epod.* and that *Barrire*, to Bray as an *Elephant*, comes from it. Thus ^{12.} we have from *Pellonius*, *Elephantes barrire dicimus, sicut Oves decimus ballare*. Amongst the *Indians* they are call'd *Prasij* and *Taxilla*. Thus *Elianus* says, *Maximi Elephantorum qui illic sunt Prasij dicti, secundi vero ab ijs existimantur Taxilla*. In the *Punic* and *Hist. Lib.* *Moorish* Language it is call'd *Cesar*; hence it is, as *Servius* says, ^{130. 12.} *Cesar, vel quod caso Matris Ventre natus est, vel quod Avus ejus in Africa manu propria occidit Elephantem, qui Cesar Pavorum Lingua*. It is also call'd in *Latin*, *Bos*, *Lucas*, and *Elephantas*, from the *Greek*.

The *Elephant* is said to live to a great Age: Some asserting, they live to One Hundred and Twenty Years; Others, to 200 ^{To what Age they live.} Years; some to 300; and there are who affirm, that they can live till they be 500 Years-old, and that they are very strong and robust at the 200 Year. *Tentzelius* tells us, that when a certain *German*, who had sometimes been in the *Indies*, saw these Bones. he treats of, concluded from certain Marks the *Indians* have, that that *Elephant* could not have been under 200 Years old. *Mr. Tavernier's* *vernier* says, he could never learn exactly how long the *Elephants* *Travels in* liv'd; but that their Keepers have told him, they knew such an *India*, p. 26. *Elephant* to have been in their Great Grand father, Grand-father, and Father's Custody, which he modestly computes not to have been under 120 or 130 Years. And 'tis memorable, which *Juba* King of *Lybia* told, as it is related by *Philostratus*, that the Knights of *Lybia* at a certain time fought upon *Elephants*, some whereof had a Tower engraven upon their Teeth, others nothing; and when by the Night they were separated, such as had the Tower were beat, and fled to the high Hill *Atlas*: And that the same *Juba* after 400 Years took one of them, which had this Ensign so lively engraven, as if it had been but lately done. I am not to answer for the truth of this, but they seem generally to live to a great Age; for the Keeper told, that the *Elephant* which fell in our way was 26 or 28 Years old; notwithstanding which she seems to have been Young, according to the Term of Life, for the *Epiphyfes* separated from the Bones by Boyling as easily, as those of an Human Subject would have done at the Age of 10 or 12. However, 'tis an Animal Subject to many Distempers; so that

that tho' they may live to some of the fore mentioned Ages, yet mostly them perish before they come to such length.

Usual bigness
of the Ele-
phant.

Bochart de
Animal. S.S.
Script. C. 27.
Col. 269.

Philost. lib.
2. c. 1.
Lib. 3. C. 41.

Heliod. lib.
9.

Cap. 62.

Their man-
ner of Pro-
creation.

'Tis certainly an Animal of considerable Bigness; but whether ever so large as to contain 32 strong Men upon its Back, as is related *Maccab* (b. 6. v. 37. beside the *Indian* that govern'd it, is much to be doubted; and 'tis more probable that this is an Error in the Impression, as is well enough observ'd by *Grentemesnil*, who instead of *Ἀνδρες δυνάμειος δύο καὶ τεσσαράκοντα οἱ πολεμῦντες ἐπ' αὐτοῖς*, *Viri fortes duo & triginta, pugnantes in ijs*, believes it should be rather, *Ἀνδρες δυνάμειος δύο ἢ τρεῖς ἀκόντιστοι πολεμῦντες ἐπ' αὐτοῖς*, *Viri fortes duo aut tres pugnantes super ipsos Faculis*. Indeed *Philostatus* speaks of 10 or 15 *Indians* fighting in Castles with Darts on *Elephants* Backs: And *Paulus Vineta* says, that in the *Ginger Islands* they have Wooden Castles upon *Elephant's* Backs, which can contain 15 or 20 Men. But the Learned *Bochart* very pleasantly says of these Authors, that *de magnis majora loquuntur*; because this is a big Beast, they delight to speak at random of it. I rather believe what *Heliodorus* says, that the Towers upon the *Elephants* Backs could contain 6 fighting Men, who from each side drew Darts, the hinder part remaining void; or *Cadamustus*, that they put Towers upon the Back, which can hold 3 or 4 Men that fight upon them; and *Ælianus*, that they carry 3 Warriours fighting from either side, and the 4th which governs them. Which 3 last Accounts seem very well to quadrate with the usual height ascrib'd to them: About which some Authors talking more largely, tell us of 18 or 16 foot high; but the most received Account is, that they are from 13 to 8 foot: So that as our *Elephant* was none of the biggest, she did not seem to have been any of the least size. I shall give you her particular Dimensions hereafter.

The next to be consider'd, is their manner of Procreation, about which Authors differ very much. All agree that it is an Animal of extraordinary Modesty, and therefore never copulates in view of any; which because 'tis a big unweildy Body, hath put Authors to a loss as to the Posture. Some asserting, that it is Retrocoient and Retromingent; among whom is *Dr. Moullins*, from an Observation he has made of the Situation and Structure of the *Penis*. Others observing the distance betwixt the *Anus* and *Vagina*, and that the Duggs are situated between the fore Limbs, are of Opinion, that the Female is in a Supine, and the Male in a Prone Posture: Among whom is *Tavernier*, who tells us, 'That the Female gathers a great deal of Herbs and Weeds, and makes her

her Bed some 4 or 5 foot high from the Ground, where she throws herself, and lies on her Back in expectation of the Male, whom she invites by a peculiar Cry; therefore perhaps it may be, that the Duggs are placed so forward, to avoid the Pressure. A third Opinion is, that at the *Coitus*, the Female descends into a Ditch, and that the Congress with the Male is no otherwise with them than with other Quadrupeds. As to the first, I can scarce believe it probable, because there can be no such thing as a Retrocoient Animal; for that would quite invert the order of Nature, and give a far different motion to the Muscles of the Thighs, than they can be supposed to have from their Situation; and I am credibly inform'd by those, who have been at the Pains to observe them, that Hares, Cats, Rabbits, &c. who are said to be Retrocoient, do Copulate no other way than Dogs and other Quadrupeds; and that Retrograde Posture we see Dogs in at that time, is nothing but an endeavour to get rid, when (by means of the swelling of the *Glans*,) the Male and Female are too close together, and far from a design of penetrating further into the *Vagina*. As to the second Opinion, were it not for Monsieur *Tavernier's* Assertion, I should think it too unweildy an Animal, and of too small an Inclination to lye down, to acquire such a Posture. The third Opinion is, that the Natural Sagacity of the Animal disposes the Female to go into the Ditch, and both fore and hind Legs seem to be so articulated as to favour this: For when the Female would bring the Body low, she has no more to do, but to stretch forward her fore Feet, and then the Articulation of the *Humerus* with the *Cubitus* will bend backward; and to bring back her hind Feet, so as to bend the Knees forward, by which she can bring the fore part of the Body so low, as to make the *Nates* Protuberant, and bend the hind Legs, whereby to put the *Vagina* in a convenient Posture for Reception of the *Penis*, according to that of *Aristotle*, *Subsistit Femina, Clunibusque Submissis, insistit pedibus ac inmittitur*; and elsewhere, *Flectit certe suos posteriores Poplites modo Hominis*. Which of the two last Opinions may be true, I know not, but you have the Assertion of two famous Authors for both.

What Time they begin to Copulate is uncertain; tho' from *How long* their usual term of Life, Authors seem probably to conjecture, *they go with* that some begin at the fifth Year, others much later, yea, not *Young* till the Twentieth. The time also of their going with Young is in debate; for their innate Modesty keeps such as would

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observe

observe them from any certainty. The only way to know, is (where they abound) to observe their separating themselves from the Flock; for it is a gregarious Animal, as Naturalists term them; and 'tis observ'd, when they begin to be proud, (so to speak,) that the Male and Female go apart, (and if any observe them at that time, the Male runs upon them with Fury and Madness) and do not return till the Female is impregnate. Some fondly imagine from their extraordinary Bigness, that they go with Young 9 Years, others 6, and others 2; but to me the most probable is, that of 15 or 16 Months; and if we observe the ordinary course of Gestation in other viviparous Animals, it is according to the Bigness and Term of Life, that the Female usually goes with Young. Thus you have Bitches and Cats going but 9 Weeks, while Mares and Cows go 9 Months: So that, *Ceteris paribus*, this our Animal may be suppos'd to go 15 or 16 Months; and Mr *Knox* in his Relation of the Island of *Ceylan*, tells us, they go not with Young above one Year: Some say, they bring forth after every third Year; and others, never but once in their Life. The first Opinion may be probable, but the second is scarce to be believed; for it would be still more wonderful, and next to an Impossibility, to see such Numbers of *Elephants* in Armies and Countries, as we read of. Mr. *Tavernier* tells us, 'He has been inform'd, that the Great *Mogul* keeps Three or Four Thousand *Elephants*; but that the chief Master assur'd him, he had not above 500 said to be of his House, and design'd for carrying Women, Tents and Luggage, and about 80 or 90 for War; which is a great Number of tam'd ones. And from thence we may suppose, that there must be a far greater Number of Wild ones in his Dominions, besides what are in the Kingdom of *Pegu* (where, as *Schotto* relates from *Garzia ab Orta*, at one Hunting there were 4000 taken at once) *Siam*, *Cochin* and *Bouan* near Great *Tartary*, besides these of the Island of *Sumatra* and *Ceylan*; where *Tavernier* reports for a certain truth, 'That when any *King* or *Raja* has one of them, if they bring the Breed of any other Place, so soon as the other *Elephants* behold the *Ceylan Elephants*, by an Instinct of Nature they do them Reverence, by laying their Trunks upon the Ground, and raising them up again. 'Tis said the Male never copulates with the Female after once she is impregnate; and some will have us to believe, that every Male keeps to his own Female. 'Tis also said to be a very temperate Creature, and seldom in Lust.

Tavernier

*Acta Lips.
Suppl. Tom.
6. 1. pag. 39.*

*Mirab. Animal. Ter.
lib. 8.*

*Tavernier's
Travels in
India 195.*

Tavernier tells us, that the Male never meddles with the Female when once he is taken, but is sometimes seized with a lustful Rage; whereof he gives this memorable Instance: 'One Day when *Chajehan* King of *India* was a Hunting upon one of his *Elephants*, with one of his Sons who sat by him, the *Elephant* became so furious by reason of his Lust, that the Governor, who was by no means able to master him, declar'd to the King, that to allay his Fury, who would else doubtless bruise him to pieces among the Trees, there was no way but for One of the Three to forfeit his Life, and that he would willingly Sacrifice his for the safety of the King, and the Prince his Son; only he desir'd his Majesty would take care of his Children; which said, he threw himself among the *Elephant's* Feet, who had no sooner taken him in his Trunk, and squeez'd him to pieces with his Feet, but he grew as quiet and peaceable as before. Whether this Rage proceeds from Lust, or it be a kind of Madness, which *Mr Knox* in the forecited Place tells us, they are seiz'd with at certain Seasons, which is known by the Efflux of a Liquor from their Jaws like Oyl, and which afterwards goes off of its own accord, I shall not determine; but 'tis probable to have been the latter, and that by this sign the Keeper did know the Disease. The said *Mr Knox* adds, that the Females suckle indifferently the young ones of others as well as their own. 'Tis reported of them, that they only bring forth one at once, tho' if it were not for the unanimous Assertion of all Authors, I would be ready to believe they bring forth more, for Reasons hereafter to be given; and that that one is about the bigness of an Hog, or as some say of an big Calf; which seems to quadrate with the Account of *Tavernier*, who tells us, that when the Merchants bring the *Elephants* to sell, the Children do usually leap upon their Backs, which could not be done were they higher. They are said to suck for 6 Years, or according to some 8; tho' I rather adhere to the Opinion of those, who tell us, they quit their Dame at 6 Months, if it be true, that when they are brought forth, they both see and walk; for if so, they may as soon come to purchase their Food as Colts and Calves.

The Natural Food of the *Elephant* is Grass, and when that's wanting, they dig up Roots with their Tusks. This perhaps may be one of the Reasons, why the *Behemoth* is taken for the *Elephant*, because 'tis said to eat Hay like an Ox; but that, as *Bochart* tells us, is common to the *Hippopotamus* also. They are said to have a

great delight in Cucumbers and Melons, and a particular Instinct in avoiding whatever Herbs may be hurtful to them. 'Tis also observable, they will not go near any Grass that has been trampled on by Men, for fear of Snares. When they are tam'd, they eat Hay, Oats, Barley, or such other Food as Oxen and Horses. It drinks a great quantity of Water, which it sucks up by the Trunk, and whenever that's full, it emptieth it in the Mouth. It naturally affects muddy Water rather than clear: When Tame, it drinks clear Water well enough. When they are to go to Battel, they give them Spirituous Liquors, such as Wine, &c. in order to make them drunk and furious, as appears from the History in the third Book of *Maccabees*, Chap. 8.

Acuteness of Smelling.

It has a very acute sense of Smelling, by which it readily finds out its Food. 'Twas pleasant, that, when they came to see the Creature, with Apples in their Pockets, it pull'd them out to the astonishment of those who had them. I'm inform'd one of the greatest Mischiefs it got, was, when in the North of the Kingdom, being in an House, next to which was another with a great deal of Corn in it, and the poor Beast being hungry, and smelling the Corn, beat up and prest into a very narrow Door, where its Sides were very much crush'd, and they had much ado to get it out: And when at *Perth*, it beat up a Stable next to the House where it was, and most industriously singl'd out the clean Straw from among the Dung that lay among the Horses Feet.

Several Natural Functions of the Elephant.

I come next to give you some Instances of its Natural Endowments, the manner of taking it, and its wonderful Docility when Tame. *Pliny* says, that *maximum est Animal, proximumq; humanis Sensibus*; as appears in their Care of their Young, for they rather chuse to lose their own Life, than that they should lose theirs. They always go in Flocks, and the greatest go foremost, and when they are to pass a River, they lift the young ones across upon their two Tusks, and twist the *Proboscis* round about their middle; and make such as are bigger go before them, the greatest coming last; for did the greatest pass first, the River might chance to be so deep, that neither the lesser ones could pass, nor the bigger so readily assist them. When they pass by any of their Dead, they cover the *Cadaver* with Branches of Trees, Grass, or what else they can get. When any is wounded, the rest take care of him, bring him Meat, relieve him from Danger, and run together to save him from the Hunter. When a Snare is laid for them, they soon perceive it; if it be a Ditch, he that's nearest halts,

halts, (as it were by an Instinct) which when the rest perceive, they immediately return with Fury upon the Hunter. *Tavernier* *Loco citato.* tells us, 'That being once deceiv'd, and having escap'd the Snare, they are very distrustful ever after: and when they get to the Wood again, they break off a great Bough from one of the Trees with their Trunk, with which they examine every Step they go, before they set down their Feet, to try if there be any hole in their way. When they go in Troops, if one of them perceives an Herb on which any Man has tramp'd, he pulls it up, and delivers it to the next, who smells it and gives it to a third, and so on till it come to the last, who makes a great Noise, upon which all go to flight, and retire to Hills, Mountains, Shady, and other less frequented Places, where when there is no more Grats, some dig up Roots, others go and pull tender Buds, Herbs and Leaves of Trees; and the first that finds any thing, returns and convenes the rest of the Flock, that he may communicate to them what he has purchased. When they are in a Battel, such as are wearied or wounded, return to the Multitude, and such as have been less expos'd, advance of their own accord. When they are to pass over a Ditch, one or more go down (according to the breadth of it) and stand across it, where making as it were the Column of a Bridge, all the rest stepping upon their Backs, pass over. When all have pass'd, they bring him or them out after this manner: At the side of the Ditch, one of them stands, and stretches out his Foot, which he that is in the Ditch takes hold of, by twisting his *Proboscis* round it; then the rest make haste and provide Branches of Trees, which they throw in, that he may the more easily step up upon them.

Their Love, Fidelity and Gratitude is wonderful: *Ælianus* tells *Their Love*, us, when *Porus* King of *India* was subdu'd by *Alexander* the Great, *Fidelity and* he was wounded with several Darts, as was the *Elephant* he rode *Gratitude.* upon, who was careful to pull them out of his Master's Body with his *Proboscis*; and when he perceived his Master faintish by the loss of Blood, he gradually lean'd himself down, till he fell flat upon the Ground, that his Master might receive no damage by lighting off. There is also a Story related by *Athenaus*, of the Gratitude of an *Elephant* toward a Woman, who had done him *Lib. 13.* some piece of Service: She laid her Child by him, when it was only Thirty Days Old, but afterward the Woman being Dead, he fell so in Love with the Child, that he could not endure it to be absent from him, being most uneasy when he did not see it; there-

therefore when at any time the Nurse had sati-fy'd the Child, she laid it in a Cradle between his Feet; which if she had not done, he would not eat any; but when she did it, he would eat pleasantly by the Child the whole Day. When the Child slept, he chas'd away the Flees with the *Proboscis*; and when it cry'd, he would toss or rock the Cradle, and thereby set the Child asleep again. Several Instances of this Nature might be given from Authors, but these may suffice.

Wrath and
Revenge.

Annal. Par.
I.

But as their Love and Gratitude is great, so likewise are they subject to Wrath and Revenge. *Michael Glycus* tells, that when an *Elephant* at a time was brought into a Theater, he saw as he came along a Keeper of Wild Beasts sitting in the Market Place, whom in Passion he suddenly kill'd; and that the occasion of this Revenge was, because the said Keeper about Ten Years before had stricken him with a Sword in that same Place. And *Acosta* writes, that a Soldier in the Town of *Cochina* had thrown the Kernel of a Nut at an *Elephant*, which the *Elephant* took up, and carefully hid. Some Days after, the *Elephant* seeing the Soldier passing by, threw it into his Face, made a great Noise, and went away leaping and dancing. In that same Town another Soldier meeting an *Elephant* with his Keeper, would not give way to them, whereupon the Keeper complain'd to the *Elephant* of the Affront, who some Days after standing on the River *Manguta*, which runs through the Town, and seeing the Soldier standing idle, run hastily toward him, lifted him up on the *Proboscis*, and plung'd him several times in the River; after which he drew him out (having thus aveng'd himself) and left him where he found him.

The Method
of taking
them.

The manner of Taking them is; first, they dig deep Ditches, and cover them with Branches of Trees, &c. which, tho' the *Elephants* may sometimes perceive, as is said, yet they are frequently ensnar'd therein: When any fall in, the rest are ready to throw in Branches of Trees, and such other Material as they can get, to see, if by any means, they can rid their Companion. Another Method us'd by the King of *Pegu* is, he builds Prisons for them of Wooden Pillars, at such a distance as to suffer a Man to pass, but not an *Elephant*; then he causes to be let go into the Woods some tame Females, whose *Pudenda* are anointed with a certain Oyl, for enticing the Male; and taking care that they do not copulate, they drive all together toward the Prison, whence they convey the Females into Stables, which can contain no more but

but one at once; and the Males not in pursuit are caught among the Pillars, and immediately some By-standers lay across Pales of Wood to hinder their Return. When they perceive the Cheat, they turn all in a Rage and Fury, and fall a groaning even to the shedding of Tears, and run up and down till they be all in a Sweat. When the Hunters design to put them in Stables, they let them see the Females again, whom they lead foremost, and the Males follow them to the intended place, which is so little, that it admits no more but one at once: Then they remove the Female, and tie the Male by the Neck to the Stall, till being wearied both by Hunger and Grief, they become more Tame, which is usually after 8 Days fasting, and then the Keeper learns and manages them as he pleases. A third Method of taking them us'd by the said King is this: He gathers a vast number of Men, by which he surrounds the whole Forest where the *Elephants* haunt, and having enclos'd them within a narrow bounds, he picks and chuses such as he has a mind for, and lets the rest go. *Garcias de Orta* says, that at one of these Huntings there were taken 4000, but that the King caus'd them all to be let go, except 200, lest his Country should be depriv'd of them. 'Tis memorable what *Edward Lopez* says he saw, that when a young *Elephant* was catch'd in one of these Snares, the old one run with violence (notwithstanding of the By-standers) to get it out; whereof being disappointed, she threw in Earth, Trees and Stones in such abundance, that it fill'd the Ditch, and rather chus'd to destroy its own Brood, than let it fall into the Hands of the Enemy.

But if what Authors have told us of their manner of Taming *The manner* be true, 'tis a wonderful Token of their Natural Sagacity. After *of Taming* they are taken, they hedge each of them in with great Rascers, *them.* till they be enclosed in so narrow bounds, that they can scarce have place to stand: Then they tie their Feet and Tusks so together, that they cannot move; their Keepers mount them, being girt about with two Ropes, and striking with their Heels and Clubs, threaten to beat them, and to starve them till they should Die; but if they will be quiet and peaceable, they would be kind to them, anoint them with Oyl, and give them Meat and Drink in abundance. Then they take one of these wild ones, and put it in betwixt two Tame ones, and so confine it on both sides till it be Tame enough. *Tabernier* tells, that he saw once two Wild *Elephants*, which had been lately taken, each of which had a Tame one plac'd on each side. Round about the Wild *Elephants* stood

stood 6 Men, every one having an half Pike in his Hand, and a lighted Torch fastned at the end of the Pike, and talking to the Beasts gave them Meat, and cry'd out in their Language, *Take it, Eat it.* The Food which they gave them was a little Bottle of Hay, some pieces of brown Sugar, and Rice boild in Water, with some few Corns of Pepper. If the Wild *Elephants* refus'd to do as they were bidden, the Men made Signs to the Tame *Elephants* to beat them, which they did; banging the refractory one with their Trunks on the Head and Forehead; and if he offer to make any resistance, the others thwart him on the other side; so that the poor Beast not knowing what to do, was constrain'd to learn Obedience. 'Tis said these Methods soon take with the younger sort, but for the old ones they put them into big Houses, and treat them very harshly, by wounding them with Darts, and starving them till they be half Dead; and then by gentle Methods and fair Promises they tame them. *Ælianus* says, when all other Methods prove ineffectual with an old one, they have a certain kind of Musical Instrument, wherein they play the r own Natural Tune, to which they become so attentive, that they are soon taken with the sweetness of the Melody; and laying aside their Wildness, begin to look to the Meat that's offer'd them, and tho' they should take off the Fetters, forget their ancient rudeness, and fall to their Meat with Greediness and Appetite. 'Tis indeed very surprizing to think, they should understand either Flattery, Threatning or Musick, when Tame, and if when Wild they do it, 'tis much more so. However, that it is a most docile Creature the Accounts of all agree, and Authors tell you wonderful Stories of them, such as their Dancing to a Pipe, and keeping Time, Leaping, Skipping, Gathering and Strowing Flowers, exercising Fuzee and Pike, like a Soldier, and casting of Colours, playing a great many antick Tricks in Theaters, and even Writing too, and understanding Human Speech. When it is in Sorrow, it hangs the *Proboscis* low to the Ground, and 'tis by the same it makes its Gladness appear. It is an Animal very desirous of vain Glory, and very Proud, when finely drest and richly adorn'd.

A brief Description of the External Shape of the Elephant.

But leaving this, I come to the more particular Consideration of the Creature I am now treating of. I shall first take notice of its External Shape and Dimensions, and then of its Internal Parts, with their Structure. That it is *Animal Vastissimum*, I shall readily acknowledge with *Franzins*; but that it is deform'd, since those

due

due proportions laid down by the Author of Nature are as well observ'd in this as in any other Animal, I can hardly grant; for nothing can be deform'd but what swerves from a general Rule. It has a big short Head, short Neck, long Nose, or *Proboscis*, hanging almost to the Ground; a Back somewhat protuberant, a short and round Body, a long Tail, four great round Legs, like so many Columns supporting such a vast weight; and short Feet, those before being broader and rounder, and those behind more long and narrow, each Shod with 4 Hooves; a little narrow Mouth, with 2 long Tusks proceeding from the Upper Jaw, one on each side of the *Proboscis*; 4 strong Grinders in each Jaw; small, yet piercing Eyes; and large flat Ears.

The Dimensions are as follow: At the fore Leg she was $8 \frac{1}{2}$ foot high (A. A.) and 9 at the hind (B. B.) in length 10 foot (C. C.) and a Tail 4 Foot 3 Inches long (C. D.) round the Belly 14 Foot (E. E.) from the top of the Head to the end of the *Proboscis* 8 Foot (F. F.) whereof the *Proboscis* makes up $4 \frac{1}{2}$ foot (F. G.) from the Forehead equal with the Eye to the lower Jaw, measuring backward, 27 Inches (H. H.) from the top of the Head to the lower Jaw, measuring downward, $4 \frac{1}{2}$ foot (F. I.) The Ear was almost square in this Subject, and small in respect of those in other Animals. Whether or not this difference might have been in regard of the Sex, I know not. 'Twas in length 19 Inches (K K) and in breadth 17 (L L.) The Eye (U) was not so small as Dr. *Mou-lins* would have it; who says, they were no bigger in the Subject he treats of than those of a Sheep; whereas in this they are larger than those of an Ox. The distance betwixt them, measuring across, was 26 Inches; between the *Anus* and *Vagina* $2 \frac{1}{2}$ foot; between the Dugs 1 foot. The fore Foot, measuring round the extremities of the 4 Hoofs, 3 foot 10 $\frac{1}{2}$ Inches (N. N.) whereof the external Hoof running obliquely forward was 5 Inches; the second on the outside, square before, was 7 Inches, and 6 in breadth, i. e. up toward the Skin; as was the third, square also before, and $4 \frac{1}{2}$ half, (c) The Internal was more pointed than the External, and of the same length; the hind part of the Foot was cover'd with a tough thick Skin: The Diameter of the fore Foot, from the Right to the Left, was $14 \frac{1}{2}$ Inches; from before to behind, $15 \frac{1}{2}$ Inches. The Circumference of the fore Leg, at the Upper Joint, was 4 Foot 3 Inches (O. O.) At the Articulation of the *Carpus* 2 foot 6 $\frac{1}{2}$ Inches (P. P.) the Circumference of the hind Foot, round the Hoof, 2 foot 4 Inches (Q. Q.) Its

*The particu-
lar Dimen-
sions of the
stuffed Skin.*

Diameter from behind to before, $16 \frac{1}{2}$ Inches; from the Right to the Left, 12 Inches. The breadth of the outer Hoof, $4 \frac{1}{2}$ Inches (*b.*) the fore Hoof being Semicircular, $3 \frac{1}{2}$ Inches, (*a.*) the third and fourth Hoof 4 Inches each; both inner and outer Hoof go obliquely forward. The Circumference of the hind Leg is 2 foot 2 Inches, (R. R.) Thus you have the Dimensions of all its External Parts, taken either from the Body, when it lay Dead in the Field, or since from the Stuff'd Skin, wherein for the most part they agree; only that by reason of drying, the Legs are smaller, and the Back not so protuberant.

*The Cuticula
and Cutis
describ'd.*

Now I come to consider the *Cuticula* and *Cutis*, being the first subjected to Enquiry. Dr. *Moulins* has already at large insisted most judiciously on both, and indeed he had good Opportunity to do so; for he had the choice of any part of the Skin he pleas'd, (to view its Structure) that was not defac'd by the Fire; whereas in our Subject, the chief endeavour of Provost *Teaman* being to preserve the Skin whole, in order to Stuff it, (which is now done to so good purpose and so lively, that it is become a most curious Ornament, as the Figure after the Original, which now stands in our Hall, doth represent) I had not an opportunity of making tryal upon any of it green; for on the *Monday*, while I was oblig'd to go out and take care of the Bones, the Workmen were busied in salting and preparing it, and afterwards I had not time: So that what Accounts I can give you are taken from it, as it now stands dry. But that I may give you all the satisfaction I can, I shall transcribe what of Dr. *Moulin's* Account I find agreeable to that I see in this Subject, and add my own Observations.

*Dr. Moulin's
his Account
of the Scabs.*

He says, ' he found the *Cuticula* cover'd all over with a strange sort of Scab, in many Places resembling old Wrats, deeply jagged, and the carnos Fibres of the Muscles of Beef when much boil'd and transversly cut, but of a dirty tawny Colour. These Scabs (if they may be so call'd) both slit and look like short pieces of Whale-bone; they did so firmly stick to the *Cuticula*, that they could not be pluck'd from it, nor the Parts of which they consisted (tho' they were much divided) from one another, without tearing it, and yet the *Cuticula* was very tough and thick.

This

This is very lively exprest, and Answers exactly to what I find in this Subject. He goes on, and says : ' The length of these Scabs was in some above $\frac{1}{2}$ or $\frac{1}{4}$, but in other places not above $\frac{1}{10}$ or $\frac{1}{12}$ of an Inch. The cause of which difference, he takes to be the Elephants wearing, by rubbing or lying, some Parts of them, while others were slightly, or not at all worn. *Their length in his Subject.*

' The Scabs of this Subject were not so long ; for as the deepest I could find upon the Cuticula was not above $\frac{1}{2}$, so the thinnest was less than $\frac{1}{10}$ of an Inch ; but that is not material. As to his Reason why they are thicker in some Parts than another, tho' it may seem pretty good, yet I shall offer another by and by, as a no less probable Conjecture. *In ours, Tab. 3. A.B.*

He says, ' He could find but very few Hairs without this Scab, but many within, and even with it. The on to Itch, and to rub himself against whatever came in his way, kept those Hairs that were even with the outside of the aforesaid Scab, from appearing of any considerable length. The hardness of the Scab, by keeping the Roots of the Hairs fast, did very much contribute to their wearing on the outside, as well as to their Preservation on that within. *The Hairs in The Elephants Inclination.*

In our Subject the Hairs are every where pretty long, some 2, some 3 Inches ; others (in Places most Subject to Rubbing, as the Doctor observes) but 1 or $\frac{1}{2}$ Inch, tho' indeed not so numerous as I find. There are Passages for them through the Cuticula. I know not what the Doctor means by distinguishing between those found in the Cutis, and those in the Cuticula, since I am convinc'd all arise from the Cutis, and penetrate the Cuticula. They are indeed black, and many of them stiffer and thicker than those in an Hog. As he by the Fire had occasion to observe some pieces of the Cuticula rais'd from the Cutis, so the Skin of this Subject is in many Places depriv'd of it, especially where the Beast lay most in the Water at its Death ; and since these are means whereby to separate the one from the other, this may give occasion to enquire by what means they adhere : But I must first consider the Structure of the Cuticula, and then of the Cutis. You know some have taken the Cutis to be nothing but a certain Crust form'd of several Mucilaginous Particles, obducing the Cutis, &c. in the Uterus ; which after the Fetus is come to greater maturity, is condens'd and form'd into a Skin, such as we see Mucilages and Pulseses have, when after boiling they are expos'd to the Cold : Others, that the Cuticula, as well *In ours, The Structure of the Cuticula.*

as *Cutis*, is compos'd of a *Congeries* of *Membranous Fibres*, intermixt with a great many *Capillaries*, and endued with Pores fit for Perspiration: And there are Anatomists who assert, they have injected these Cutaneous Vessels in the *Cuticula* of a *Fetus*, as well as in the *Cutis*; tho' when the Animal is more adult, these *Capillaries* not only escape the view of the naked Eye, but even of Opticks. That this has been the Structure of the *Cuticula* in this Animal, is most plain and obvious; for tho' I cannot determine its thicknes, as Dr. *Moulins* might have done in a recent One, yet now as it is dry, it seems to be of the thickness of, or rather thicker, than common Vellum, with its inner Surface excavated, as you see a Woman's Thimble, (the Holes being much about the same Bigness, and dispos'd regularly) or in an Honey Comb. Among the Interstices of these Excavations, the Ramifications and Divarications of the Blood Vessels are obvious. At every two Lines or $\frac{1}{4}$ of an Inch distance, for the most part are to be observ'd Protuberances compos'd of 5, 6, or 7 Columns joining, and making up a Pyramid or Cone; in the top whereof is the Pore or *Ductus*, mention'd by Dr. *Moulins*, through which the Hairs pass; they are nothing but the Interstices of the *Favi*, (so to call them) or Depressions, which arise in the *Cuticula*, and are impacted in the *Cutis*, for the better Reception of the Hair. And 'tis probable, that all the Hairs are cover'd over with thin Membranes, as Dr. *Moulins* observes, from the Extremity of their Roots to the *Cuticula*; because having pull'd out several of the Hairs, I saw them included within their proper *Involucra*, and doubt not but it was so with all the rest too, beside the common one which is both contiguous and continuous to the *Cuticula*. The Hairs are more loose, and the Pores more patulent and obvious in the *Cuticula* now dry'd, than I suppose they were when recent; but whether these Pores were also designed for Separation of Vapours by Perspiration, or only to contain, and convey the Hairs planted in the *Cutis* through the *Cuticula*, is what I shall neither contradict nor affirm. To the outside of this *Cuticula* are adherent the Scabs, which I rather take to be a Supervenient Distemper incident to this Animal, when out of its own Climate, occasion'd by the Constriction of the Pores from Cold, than any wise Natural to it: And to this the Accounts of all Authors agree; who tell us, that there are two kinds of them, one of a more dark Colour, and another dusky and sad, having both their Skins of a very smooth and polite Surface; wherefore

Tab. 3. A.

The Cause of
the Scabs.

fore the Keepers of this *Elephant* with us, call'd it the *White Elephant*, in opposition to the black ones; whereof *Horace*, in the forecited Place, says, *Nigris dignissima Parris*: But after they are affected with the Scab, this Distinction of Colours is not observ'd. Authors tell us, as you have heard, that the first thing they do when they begin to Tame them, is to anoint them with Oyl, whereby they keep their Skin smooth, soft and flexible, and relax their Pores so, that whatever gross Particles may fly off from their Blood, whose Constitution is now perhaps worse by the alteration of Dyet, and hardships they undergo at taming, may not stick to the Skin, but freely be evaporated. And I am credibly inform'd by such as have liv'd long in the *Indies*, that they take as much care to keep the Skins of the *Elephants* smooth and clear, as we do with our fine Horses. Since then these Scabs are a Disease, and not Natural to the Animal, it is reasonable I should enquire into the Cause of them; which to me seems to be à *Crassitie & Viscositate Sanguinis*, whose Particles, because of obstructed Pores, by a Cold too excessive for their Body, do not so easily fly off; but after they have past the *Cuticula*, go no further than its Surface; and because of the *Viscosity* of their Texture, do so cleave to and heap upon one another, that they appear under the form of a Scab; which by the Evaporation of the more humid Particles, harden by degrees, and by the heat of the Sun are crack'd, rent, and divided: That Coldness of the Weather will occasion gross and viscuous Blood, there's none acquainted with the Distempers in these Northern Countries will readily deny; nor that most of these Distempers proceed from the Obstructions of *Capillaries* and *Pores*, and that this may be the cause of these Scabs. I offer only this one Experiment; whatever Pieces of the *Cuticula* I observ'd, where the Scabs were thin, there the *Favi* or Depressions were large and conspicuous; but where they were very thick, there the *Favi* were very small, and almost imperceptible; which plainly implies, that wherever these Particles avolute freely, few adhere to the Surface of the Skin; but when their Force is inhibited by the strictness of the Pores, they are unable to remove any further than they adhere to, and augment the *Moles* of the Scab. These, as is said, are divided from one another by several *Rime*, *The Scabs* or Rents, which may either be occasion'd by the afore-mention'd *divided into* heat of the Sun, or by the different Posture the Skin is put in by *several* the several Motions of the Body. Hence it is, that where the *Rime*.
Skin

The Constitu-
tion of the
Elephant's
Blood.

Skin is most wrinkled, these *Rime* are most frequent. It may be said, that this Reasoning seems to contradict what Dr *Moulins* has asserted, viz. That this Animal has a very subtile Blood, abounding with a penetrating Urinous Salt; which he proves from the Vivacity of the Species, from the Urinous *Effluvia* which affected his Nostrils, and from the smarting of his Finger by the Blood, after it was cut. As to the first, that it is a very Vivacious and Spirituous Animal, both the foregoing Relation and the Account of all Authors make it apparent; but that does not hinder its Blood from being incrassated by Cold and bad Dyet, nor that these Scabs may proceed from this gross Blood. As to the second, tho' he might have been sensible of an abounding Urinous Salt in that Animal, it does not follow it should be so in all, and I am apt to believe it was extraordinary; for without doubt such a burning as the poor Beast underwent, even to its Death, must have alter'd the Constitution of its Blood, and made it quite different from what it was; and 'tis probable, that it was at such places, as were most affected with the Burning, where he felt this Urinous Smell, and the smarting of his Finger. For my part, I observ'd the Blood of this Subject to be Styptick and Restricting: So that when my Hands were imbru'd in it, I could scarce bend a Finger; which Effect I have also perceived at the Dissection of Fishes, which all acknowledge to have viscuous Blood. But it may be objected, that this our Subject dying *Morbid*, and of a languishing Distemper, the Blood of the one might be gross and viscuous, and yet that of the other Spirituous and Subtile. I should be ready to acknowledge the Objection to be valid, if I did not understand both were affected with the same Scab, and by what appears, the other seems to have been more than this.

The Stru-
cture of the
Cutis:

I proceed next to the *Cutis*, whose inner Surface Dr. *Moulins* observ'd To abound with a great many Glands; when cut through, at least as far as the Roots of the Hair went, it was like the horny or callous part of Brawn, and its outer Surface abounded with a great many *Papilla*. As I said, I had not opportunity to observe any of these; but am apt to believe all to be true: And first, as to the *Papilla*; I told you already, that the *Cuticula* was endued with a vast quantity of *Favi*, or Depressions, wherein I doubt not but these *Papilla* were receiv'd, tho' the Surface of the *Cutis*, as now dry'd, is smooth; and where the *Papilla* seem'd to have formerly been, there are now rather
De-

Depressions than Protuberances. This is an Argument that there has been some kind of Liquor contain'd in these *Papilla* or Vessels, as I may call them, which at the drying of the Skin is evaporated; and therefore I suppose this brawny part of the *Cutis* to be a *Congeries* of *ductus excretorij*, running in a Parallel Line from these Glands to the Vesicles, and conveying the Liquor to be contain'd in them, till it be evaporated by Perspiration; and these Vessels seem to have been both so big and numerous in this Animal, that they make up at least two parts of the inner Surface of the *Cuticula*; the Blood Vessels and the Depressions together scarce make up a third part. They seem also to be lodg'd in the *Cutis* by the one half, and in the *Cuticula* by the other; for in some Places of the *Cutis*, I observed the Depressions as numerous, and seemingly Parallel to those in the *Cuticula*; and that, notwithstanding the *Membranula*, where the Humour was included, which now being dry'd and collaps'd, may take up some Space in the Depression of the *Cutis*. By this Account both of the *Cuticula* and *Cutis*, I come to enquire First, how the one should so firmly adhere to the other, when there seems to be no Communication by Fibres betwixt them, as appears by their easy Separation both by Fire and Water: Secondly, how considerable the Perspiration may be. As to the First; since the *Cutis* and *Cuticula* are two distinct Membranes, their Cohesion seems to be mutual: First, these Pyramids, which receive the Hairs, are impacted in the *Cutis*, and closely surround their Roots; and then these *Papilla* are impacted in the *Cuticula*, which so long as they are distended with the humour fit for Perspiration, will not readily quit the Depressions in the *Cuticula*, unless the Humour be suddenly evaporated by Fire, or the Sides of these Depressions or *Cellulae* be relax'd by Water; and there may be a certain Viscosity which obduces the Surface of both, as it were so much Glue, which either the Fire may dry up too much, or the Water dilate; so that the one can be soon separated from the other, and the Hairs either be pull'd from their place, or quit their common *Involuerum*. As to the second, viz. The Perspiration, I shall offer no other Calculation than what is already made by Dr. *Moulin*: He says, 'the Pores must be both numerous and large for Perspiration, especially if we consider *Sanctorius* his Statical Observations of a Man's insensibly perspiring in a Winters Day 350. and upwards; which is something more than $\frac{3}{4}$ of an ordinary Man's weight, supposing him to be 170 lb. and as

at this rate we must suppose an *Elephant's* Perspiration to be vastly more; but (as he says) 'tis probable, the Scabs might bar it from bearing proportion to that of a Man's: So that whatever the *Elephant* might have perspir'd in an healthy State, we may reasonably suppose it to do much less, when attacked with this Disease; which may be another Argument for the *Craffiti* & *Viscositas Sanguinis*, wherewith I alledg'd this Animal I dissected, was endu'd.

I can determine nothing about the thickness of the Skin, while recent; but as it is dry, by an Incision made upon one of the Hips, it appears to be less than $\frac{1}{4}$ Inch, and of Substance not unlike to *English* Bend or Sole-Leather.

The Cutaneous Vessels.

I had no opportunity to observe, whether there were any Cutaneous Vessels, but doubt not but there have been of them, and that in abundance; 1. from the numerous *Glands* dispers'd all over its inner Surface, which must have had Blood Vessels inserted in them; and 2. from the abundance of *Ramifications* dispers'd in the *Cuticula*, proportionable to which, it is probable, they were also in the *Cutis*.

Panniculus Carnosus.

I can say nothing about the *Panniculus Carnosus*, neither am I fully convinc'd of what is related by Dr. *Moulins*, viz. That this Animal kills the Flies, by putting itself suddenly in a Posture to wrinkle the Skin on that side that is attacked by them; so that the Cracks are forc'd close together, and the Flies bruis'd; for 'tis hard to conceive such a big Animal should all on a sudden be so nimble. I rather believe, that the *Proboscis* from before, and the Tail from behind, may supply the defect of the *Panniculus Carnosus*, (if it be wanting:) For if we consider the length of each, we shall find they come near to meet about the middle; for the Body of this Subject being 10 foot in length, the *Proboscis* and Tail make up between them near 9 of it; and what is wanting, the Air, by the force of their motion, is enough to expel the Flies, even when without their reach.

Fat.

As to the Fat, whether by reason of the extraordinary Leanness of this Subject, or if it be ordinary for *Elephants* to be endued but with little of it, I know not, but I could not have believed so little Fat to have been in any Animal as was here; for beside that there was neither a *Membrana Adiposa*, or conspicuous *Omentum*, there was not one Grain of Fat, either among the Interstices of the Muscles surrounding the Kidneys, nor round the *Anus* and *Vagina*, where 'tis usually found; and what is more, when

when I had spent near a whole Day in boiling the Bones in a Dyers Vessel, without changing the Water, except that I supply'd what was evaporated, there was not so much as a Drop of Oyl that did swim upon the Liquor.

Dr. *Moulins* takes Notice of a very strong Nervous Membrane, *Dr. Moulins's Account of the Membrana Nervosa.* (which I ingenuously confess I had not time to remark, and therefore you have it in his own Word) which obliquely descended from the *Spina Dorsi* to the *Sternum* and *Linea alba*. This Membrane was very tough, and near as hard to be cut as Whalebone of the same thickness; which all along the Back-bone was about $\frac{1}{8}$ Inch, but nearer the end I try'd it, the thinner I found it. This Membrane seem'd to terminate in the *Linea alba*, as the Tendons of the Muscles of the *Abdomen* usually do. Its Nervous Fibres were very distinguishable, and might easily be separated throughout their whole length. This doubtless was to strengthen the Creature, and perhaps that the weight of the *Viscera* contain'd in the *Abdomen*, should not distend the *Peritoneum* and Muscles adjoyning, so as to let them hang lower than was convenient. A like piece of Mechanism you may remember I communicated to you not long ago, in my Observations made upon the Dissection of a *Porpoise*.

After the Skin was wholly remov'd, there being no Time to examine all the Muscles of this huge Body, I apply'd my self particularly to those of the *Proboscis*, as being of greatest Moment. *Description of the Muscles of the Proboscis.* Wherefore the Body being Supine, I first consider'd the Neck, and upper or fore-part of the *Sternum*, where I observ'd two Pair of Muscles to arise sharp and fleshy; whereof two in the middle, from a small Origin, were extended into large Muscles, running strait forward, and distinguish'd from each other by a white Line, till they came to the point of the lower Jaw; their other side running obliquely outward, till they came over against the Articulation of the Lower Jaw with the Upper: From thence keeping the lower part of the Lower Jaw, they return'd to the foresaid point, in Figure not unlike the *Cucullaris* in Human Subjects, with their Fibres running obliquely forward from this middle Line toward their external part. This Pair serv'd to draw back the Lower Jaw, and like the *Platysma Myoides*, cover'd all its other Muscles, with those of the *Larynx*, Tongue, and *Pharynx*. On the outside of this Pair arose two other Muscles, small at their beginning, and in their Progress passing in betwixt the *Osteum Zygomaticum* and Skull, adhering to the *Musculus Temporalis*, and *Retradores Proboscidis.*

Tab. 3. Fig.
1.

Tax Wax.
Fig. 6.

Elevatores
Proboscides.

Fig. 6.

Fig. 1.

ascending run up below the *Meatus Auditorius*, half way betwixt the Orbit of the Eye and Top of the Head; where becoming very thick and round, it pass over a sharp Angle of the Scull toward the Forehead; whence descending from above the Eye, it came, and with its Partner fill'd up that hollowness in the *Os Palati* (k.) and coming still lower, made up the back part of the Trunk or *Proboscis*. Afterwards the Body being turn'd over, I had opportunity to see the *Tax Wax* mention'd by Dr. *Moulins*; which arises from a *Spina* in the back part of the Scull (c c.) whence running backward along the Sides of the seven *Vertebrae* of the Neck, it terminated betwixt the 6th and 7th *Vertebrae* of the Back, becoming still thinner in its Progress. It was about six Inches broad, pretty thick, and descended obliquely from the Top of the *Spina Vertebrarum* to above the Ribs, and cover'd all the Muscles which arise from the Neck, and support the Head; assisting them, (as Dr. *Moulins* rightly observes) because the Heads of Quadrupeds, especially of this Animal, being more pendent, have more need of Supporters than the Head of a Man, where this Contrivance is wanting. Dr. *Moulins* tells us, that it was plac'd edgewise; the Reason of which may be, because of the *Spines* of the four first *Vetebrae* of the Back, which are 4 Inches broad; whence the *Tax-Wax*, running forward (where the *Spines* are narrow, or where there are no *Spines* at all, as in the three first *Vertebrae* of the Neck) in a straight Line to the Scull, the space below it for the Muscles to move in, must be the same at the Neck as at the *Spina*, where the *Epiphyses* keep their Upper Sides at such a distance. From above this *Tax-Wax* in the Neck, do arise two Muscles, thinner and narrower at first, but thicker and broader as they go to the Scull, where they firmly adhere to the Sides of a large *Sinus* in its back part (b b.) whence ascending, being lodg'd in the Depression upon the top of the Head, and betwixt the Eminencies (d d.) they descend till they come over against the Hole for the Root of the Trunk (a.) and become thicker and round, and in their whole Descent make up the forepart of the Trunk with extremity.

Thus you have the *Proboscis* trac'd from its Origin; viz. That 'tis compos'd of two Pair of Muscles; one whereof makes up its back-part, which arises from the *Sternum*, and passes with straight Fibres in below the *Os Zygomaticum*; and from thence forward, till it makes up the Body of the Trunk itself. Another Pair, which arising from the Neck pass over the Head, and descending makes up

up its forepart. The Fibres of this Muscle descend in a streight Line, till they make up the Body of the Trunk, and then begins a strong tendinous Interstice, by which they are separated from their Copartners; whence their Fibres descend obliquely to another strong Interstice, by which on each side they are separated from their Antagonist, where the same oblique Course of Fibres is again to be observ'd, that is to say, that the *Erectores Proboscidis*, (for so we may call these which make up the forepart of the *Proboscis*) (gg) unite in a tendinous Interstice (cc) *Fig. 7.* from whence the Fibres on each side obliquely descend: So likewise the *Retractores Proboscidis*, for so we may call these which make up the back-part of the *Proboscis*, have their tendinous Interstices running down the middle of its back part; from whence the Fibres obliquely descend, almost making an Angle of a *Demi-rhombus* on each side in another longitudinal tendinous Interstice, whereby the Fibres of the antagonist Muscles are conjoin'd.

Thus you see a wonderful Contexture of 4 Muscles, so contriv'd as to perform all kind of Motions; for as either in the *Femora* or *Humerus*, from Flexion, Extention, Adduction and Abduction, proceeds a circular Motion; so here when the Elevator and Depressor, or Retractor act together on either side, then there is a lateral Motion: And when the Congener *Elevatores* and *Retractores* act, then there is either Elevation or Depression; and from these two, with lateral Motions on both Sides successively perform'd, proceeds a circular Motion. But this is not all; we see that any part of the Trunk, either Root or Extremity, or both at once, can be bended either upwards or downwards; and this I conceive is perform'd after this manner. These Fibres thus obliquely situated, are divided into several *Fasciculi*, which are separated by several tendinous Intersections; and that at the beginning of each Intersection, there is a considerable Branch of a Nerve from the hard Portion, inserted, by which one, two, or more of these *Fasciculi* may be set in Motion, without any other part of the *Proboscis* being concern'd.

Dr. *Moulin*, and not unfitly, calls the *Proboscis* a Prolonged Nose, both from its Situation and Use in Smelling and Breathing. And I think I may with good Reason make an Analogy betwixt it and the Tongue: For besides there is a great Affinity betwixt the Smelling and Tasting, since what's unpleasing to the Nose, cannot but nauseate the Tongue and Palate; insomuch, that the Nose may

be call'd a Taster to the Taste : They likewise agree in this Animal, by reason of the Diversity of Motions in both, and few Muscles that perform them, tho' elegantly express'd by the famous Bellini : ' *Quis credat*, says he, *huic tantummodo Universe*
Lingua (Proboscidi) munia deberi, ita ut paucissimis donata Mus-
culis innumeras prope dixeram obire Motiones ; Extenditur, Contra-
bitur, Dilatatur, Exeritur, Atollitur, Deprimitur, Incurvatur, modò
in Cavum aptat sese, modò in Convexum, modò usque ad Palati For-
nicem (Sursum) erigitur, modò ad Frænum usque (Deorsum)
reflectitur, quandoque Duplicatur, aliàs Externatur, modò tremis.
 By which, only the Variation of Proboscidi for *Lingua*, *Sursum* for *Usque ad Palati Fornicem*, and *Deorsum* (that is downward, when it is brought in betwixt the Fore-Limbs, or conveys any thing to the Mouth) for *Frænum usque*, all the Motions of the one are compatible to the other. And Schotto gives a brief Account of the Motion of the Proboscis : ' *Circumvolvitur eum undique & max-*

Mirab. Ani-
mal. Terrest.
lib. 8. *ima cum celeritate, eâ capit Potum & Cibum atque in Os mittit ;*
nam Proboscide non edit, sed Ore ; nec Ore nec edere aut bibere
potest absque Promuscide ; hinc Manus Nasuta vocatur. Suo enim
Rectori erigit & offert ut conscendat ; eâ Arbores prosternit ; eam,
cùm Aquis immergit, erigit ; eâque refat atque respirat. Now to
 make a further Analogy with the Tongue and it ; As the *Genioglossis*, by lengthening its Fibres from the fore and inner part of the Lower Jaw, whence it arises, to the Root of the Tongue, where it is inserted, stretches it forth ; So the *Levatores Proboscidis*, by lengthning their Fibres from the *Tax-Wax* all along the Top of the Head to the Root of the Trunk, stretches it forth also : And as the *Retractores Proboscidis* can very well perform the Motions of pulling it in, *Analogous* to the *Styloglossis* ; so the two Antagonists on either side can pull it to the adverse side, that it may perform the Actions of the *Ceratoglossis*, while the Congener *Retractores* can pull it to that same side, where they act, as is said. When I say, that the Fibres from before and behind descend obliquely from the tendinous Insertions at the middle to those at the side, I do not mean that they run simply so, but that the Fibres of each Muscle are dispos'd into different *Strata*, and that these *Strata* do intersect each other, like Lozenges, or as we see the Fibres in the *Musculus oblique Ascendens* intersecting those in the *Musculus oblique Descendens Abdominis*, and so on ; that is to say, whereas one Series of Fibres seems to descend obliquely, the next underneath that ascends again, and so continues

nues throughout the whole thickness of each Muscle. As to the circular Fibres spoken of by Dr. *Moulins*, I do not know I saw any, neither do I think them necessary for pulling up the Trunk, or diminishing it as to its length: For the great distance betwixt the Origin of these Muscles, and their Insertion at the Extremity of the Trunk, the longitudinal Position of their Fibres will they come to make a part of it, and the space they have to act it, and to swell their Belly, and their oblique Insertion in these tendinous Lines, may be look'd upon as sufficient to perform this motion; and 'tis observable for this end, that the Skin is divided into several *Plicæ* or *Links*, as we see in a Worm, when she draws up and shortens herself. Thus I conceive the forenam'd *Fasciculi* may at the beginning extremely begin to be contracted, then the *Fasciculi* next to them, and so in order till they come to the Root of the Trunk; by which successive Contractions the Bellies of all the Muscles begin to swell, and so their Fibres diminish as to their length: And there needs no more for stretching forth the *Proboscis* thus contracted, but the Fibres to resile to their former Position; which it may do with the same swiftness, as we see a Bow doth by its Elasticity when once it is shot.

These Muscles surround two large Cavities 2 Inches Diameter *The Cavities* from the Right to the Left, and 3 Inches each from above to of the *Proboscis* below, about the middle of the *Proboscis*; for as they proceed below. from the Skull they are very wide, according to the Capacity of the Hole in the fore part of the Skull, whence the *Proboscis* proceeds; of which hereafter. They are divided by a strong *Cartilaginous Septum*, which runs streight from before to behind, along the middle of the *Proboscis*. This is the *Septum* whereinto the Muscles situated in the fore and back part are inserted. These Holes are Cartilaginous, all round obdused with several Nerves, whereof hereafter; and endued with a great many Glands for separating a certain *Mucus*, wherewith the inner Surface is always bedew'd, to keep it moist and preserve it from injuries of the Air it sucks in at Breathing. These two Cavities are of great use, for they draw up and contain as much Water as serves the Animal at once, which afterward it emptieth into the Mouth, as it were from a Tunnel: They serve also for Breathing, Smelling, and uttering the Voice. The *Proboscis* is not equally great, but from 38 Inches in Circumference at the beginning, it becomes gradually smaller till it be 20 Inches at the middle, and at the Extremity 11 Inches. It has an hollow Cartilage, where the

Tab. 3. Fig.
18.

Its Blood
Vessels.

these Passages terminate. Round this is a Cartilaginous Margin, which extends itself $1\frac{1}{2}$ Inch before, and terminates in a Point; and behind it has, as it were, an hollowness, wherein this Point fixes itself, and takes hold of any thing, as it were a Thumb passing in betwixt two Fingers, and keeps it during Pleasure. This Cartilage is of great Strength, and by it the *Elephant* can take up any thing of great weight.

I come next to examine the Vessels and Nerves of the *Proboscis*. I do not find this Animal endu'd with any particular Vessels for this part; but these here, Analagous to those in other Animals, seem to be adapted for peculiar Uses. In searching for the Origin of the *Proboscis*, and how it proceeded from the Head, I separated the *Relevatores Proboscidis*; below which I observ'd four considerable Blood Vessels, a Vein and an Artery from each side, lying upon and descending in a streight Line above the a-foremention'd Cartilages, and dispersing their Branches *hinc inde* throughout the Substance of the Muscles, with two large Nerves accompanying them. I had not time to trace their Origin, but do offer these probable Conjectures about them. The External Carotid Artery, which furnishes Blood to the Muscles of the Face and lower Jaw, has already suffer'd so many Divisions and Subdivisions in the vast Mass of large Muscles in this Animal, that 'tis not probable there should yet remain a Branch so large and of so streight a Course, as to be thus distributed in this part; and the Capillaries of the External Jugular are usually so dispersed throughout the extream Parts whence it receives the Blood, that 'tis not to be suppos'd they should so soon form so considerable Branches, and these again unite into one Trunk at such distance from the *Bas* of the Skull, where the two Jugulars are conjoin'd: And besides this, the Situation of the Carotid Artery and Jugular Vein is so low, and those Branches I saw were situated so high, that I can scarce think the one proceeds from the other. It remains then, that I should enquire from whence they come. 'Tis observable both in Human Subjects and Quadrupeds, that there is an Hole below the Orbit of the Eye in the *Ox Maxilla Superioris*, through which the Superior Branch of the second Division of the 5th Pair of Nerves passes, surrounding in its Progress a Vein and an Artery; all which are dispersed in the Muscles of the Cheeks, Lips and Nose, and furnish Branches for the Roots of the Teeth of the Upper Jaw. This Hole is not so considerable in Human Subjects, but larger in Quadrupeds, especially

ally such as feed upon Grass or Hay; insomuch, that by the bigness of this Branch of the 5th Pair in an Oxe or Hart, we may reasonably conjecture they have a partial Taste, and a most acute Smell by the Upper Lip, the better to enable them to chuse their Food: For at the Dissection of a Calfs Head, you'll perceive both this Nerve and the Blood Vessels much bigger than what might be thought requisite for furnishing either Blood or Spirits to this part, were there not some extraordinary use for both. Now in this our Subject there is an Hole in the *Os Maxilla Superioris* (u) Fig. 1. (m) Fig. 2. (8.8.) Fig. 3. so remarkable for its bigness, so commodiously situated, and so well guarded, that I have good Reason to believe it may be designed for Transmission of the afore-mentioned Artery, Vein, and Nerve, and that all these are distributed into the Trunk: For if we consider the largeness of this Hole for this Branch of the 5th Pair, as it is to be seen in the inner Surface of the *Basis* of the Scull, whose Capacity is such as to contain a Nerve of above twice the bigness of what we suppose it to have been; if we again consider the *Crena* (x x) which passes betwixt the Hole for the second Branch of this 5th Pair and the 3d (i i,) and how the Hole for the *Arteria dura Matris* (k k) is only separated from the Hole for the third Branch (i i) by a small Boney *Septum*; we may suppose that this *Arteria dura Matris* enters where the third Branch of the 5th Pair goes out, and sends up one Branch (k k) which immediately enters the *dura Mater*, and another which runs forward in this *Crena* to the Hole for the second Branch of the 5th Pair (h h.) and goes along with it, and passes out below the *Lamina*, which frames the upper part of the *Sinus* for the Orbit of the Eye (S) (2) and runs forward along with the second Branch to this large Oval Hole; where after it is come, it ascends obliquely in a *Crena*, to be still seen in the Bone, till it comes to the Root of the *Proboscis*, where it is dispersed as above; and the Vein returning by the same Hole runs along with the other two, tho' it does not enter the Scull; but running backward, passes in below the forefaid *Lamina*, and descends where the *Arteria dura Matris* ascends. I cannot positively determine the Capacity of these Blood Vessels at the Root of the *Proboscis*; but they were very conspicuous, and could admit of a Goose Quill, tho' they were empty; and when they were full, I doubt not but they were above twice as big.

Its Nerves.

This extraordinary part did not want for Nerves sufficient for it, no more than Blood Vessels: For first, it has the *Nervus Olfactorius*, whereof hereafter; whereby 'tis endu'd with a most acute Sensation of Smelling. 2dly, the aforesaid second Branch of the 5th Pair; which accompanying the Blood Vessels, is with them dispers'd throughout the whole Substance of the *Proboscis*; by which it has so acute a Sensation of Touching or Feeling, wherewith this Member is more signally endued; and by which it avoids whatever is hurtful to it, as appears by that memorable Instance of Dr. *Moulins*; who tells us, that such was the Care, in that subject he treats of, for the *Proboscis*, that it thrust it two foot into hard Ground to preserve it from the Fire. 3dly, the hard Portion of the *Nervus Auditorius*; *which tho' it be dispers'd in the Muscles of the Face in Human Subjects, yet in Quadrupeds, such as Oxen, it continues undivided, till it comes to the Angle of the Lips; and here we trac'd it a good way, running forward above the Temporal Muscle, a little below the Ear, till it came to the Upper Lip; whence it proceeded to the fore mention'd tendinous Interstice, which runs down on each side of the *Proboscis*, dispersing a Branch to each of the *Fasciculi* of *Fibres* already nam'd. This seems to be chiefly adapted for the different Motions of the *Proboscis*; for as we see in the *Musculus Rectus Abdominus*, that at each of the tendinous Interstices, whereby its *Fibres* are several times gather'd together, a Nerve enters at the beginning of each *Fasciculus*; So here the Muscles of the *Proboscis* being divided into several *Fasciculi*, each of them have a Branch of this Nerve dispers'd in them; and 'tis situated on each side, that it may the more conveniently disperse its Branches both to the *Fasciculi* of the *Elevatores* and *Retractores* alternatively. The Head was so mangled at the taking it off, that we could not well find its Origin, as it proceeded from the proper Hole; but its Situation here, Analogous to that in other Quadrupeds, removes the suspicion of its being any other than the hard Portion; tho' when I consider'd its bigness, being as great as one of my Fingers, and the small Hole through which it passes from the *Processus Petrosus*, I was in some doubt about it; but when again I began to consider its Texture, I was soon convinc'd it must be that and no other. 'Twas indeed very pleasant to behold it, (for several Physicians and Surgeons of us being together, we cut off a Portion of it to know its Structure) how that several small *Fibres* were knit together into one Bundle; and how several of these

these again were involved by common *Membranula* into different *Fasciculi*, till at length all were included in one common Tunicle. We endeavour'd by Microscopes to view the Cavity of the Fibres, but could observe none: That which I suppose made it bigger, was, that when it past through the Bone, the *Fasciculi* were more strictly coherent to one another, whereby they occupied a lesser space; but no sooner had they past it, than they began to be more loosely conjoined within the common Tunicle, by which the whole Nerve appeared to be bigger.

Thus you see how signally this Member is endued with Instruments for the Performance of its different Functions. 'Tis the principal Seat of two of the Senses, and partially partakes of the third: For by it the Animal smell'd; by it Feeling is perform'd, as by the Hands with us, wherefore the *Proboscis* is not improperly call'd *Manus Nasuta*, as before we observ'd; and by it the 5th Pair of Nerves affords a partial Idea of the Taste, to what Food it takes hold of, before it conveys it to the Mouth; and it has a great Analogy to the other two Senses, viz. to the Eye, by its 3 Pair of Nerves, namely, one for its Seeing, analogous to the other for Smelling; one for its pathetical Motions, analogous to the acute Sensation, afforded to the other by the 5th Pair; and one for the Motion of its other Muscles, analogous to the hard Portion of the other; and to the Tongue, as we have already shew'd at large, by its different Motions, and by its partial Taste.

I come now to the *Abdomen*. Without having time to consider its Muscles, I caus'd it to be opened longitudinally; whereupon men the Intestines jeated out in a confus'd Mass; first the Paunches or Trypes, as I may call them, (being not unlike the *Omasum* and *Abomasum* of an Ox;) and then the smaller Intestines. Being earnest to employ what Time I had in viewing the other Parts, I let these alone after they were extracted, till Monday: But then, as I told you, (by reason of their leanness, heat of the Weather, and emptiness, there being nothing in them but a little chew'd Hay or Grass) they were all spoiled; so that I could not receive any satisfaction of them, either as to their Structure, Figure, Dimensions, or Number. The Figure Dr *Moulins* gives of a part of the *Colon* and *Rectum*, seems to be pretty good; for I took a great deal of them, and stretched them out upon the Ground: They were about $\frac{1}{2}$ foot Diameter; but I had not time to take notice of their precise length.

The Description of the Uterus.

T. b. 3. Fig. 15.

Cornua.

Cellules.

Ovaria.

I next apply'd my self to the Extraction of the *Uterus* and *Bladder*, because the *Partes Generationi Inservientes* are the most taken notice of in Comparative Anatomy. I could not get the *Vasa Preparantia* preserv'd; and only got out the *Uterus* itself, with the *Cornua*, *Ovaria*, and part of the *Ligamenta Lata*, (a. a.) of all which see the figure. 'Tis not unlike the *Uterus* of such Animals as bring forth several at one Litter, as they call it; for when I had inflated it, I perceiv'd several Protuberances to arise, (e. e.) as if they had been so many *Cellules*, such as Bitches, Cats, Hares, &c. have, for containing the several *Fetus's* with their proper *Placenta* and *Involucra*; which might have determin'd me to believe they bring forth more than one at a time, had not Authors affirm'd the contrary. For whereas the *Uterus* of such as bring forth but one at a time, is proportionably large, and the *Cornua* small; here the Body of the *Uterus* was so small (c.) that one would think it were nothing but a *Bivium* to the 2 *Cornua*: For after the Tube had past the *Corona*, which is pretty strong and close, I observ'd the *Cornua* (f. f.) to swell on every side by Inflation, leaving a *Sulcus* in the middle (d.) and these different Protuberances to arise with Depressions, as so many Interstices betwixt them. This Furrow (d.) seem'd to me to point out the *Septum*, whereby the *Cornua* were divided from each other; and these Interstices to denote, as it were, so many Membranes, whereby these Protuberances were bounded and form'd into *Cellules*, each communicating with one another. These Protuberances (e. e.) were regularly dispos'd, 2 or 3 in Number on each side of the *Septum*; and tho' some of them be obliterated, yet the *Vestigia* of others do still remain obvious in the dry'd *Uterus*, as it is now reposit'd in our Hall. I had a great Inclination to open one of these *Cornua* or *Cellules*, to know the truth of what I suspected; but would not adventure, for fear of spoiling the Preparation. Each of the *Ovaria* was as big as a large Apple, with the *Ova* fitly distinguish'd by their proper Membranes; being for the most part about the bigness of a small Pea, and all involv'd within a common thin and pellucid Tunicle, through which they Shone; but to defend them there was provided a loose thick wrinkled Tunicle, (i.) which I could remove at pleasure, it no wise adhering to the *Ovaria*; but fluctuated above them, and proceeded from the *Cornua* (g.) I open'd one or two of these *Ova*, and found them filled with a thin Limpid Substance, not unlike to *Hydrides*, but

but that the Humour was more viscuous; which is now evaporated in the dried *Uterus*, and the *Ovaria* quite collaps'd. The Extremities of the *Cornua* which received the *Ova* were very narrow; for when I had inflated the *Uterus*, it retain'd the Air for some time, without passing immediately out by the *Cornua*; tho' afterwards when I had strictly ty'd the *Vagina*, I observ'd the Air did insensibly slide out, and now and then I could see small *Bullulae* arise toward the *Ovaria*. I could not see any fluctuating *Ala Vespertilionum*, nor *Morsus Diaboli*; but do suppose, that the *Ova* are received into the Extremities of the *Cornua* by an *Hiatus*, below this loose *Involucrum*, which I told you defend-ed the *Ovaria*. I cannot determine the precise length of the *Vagina* (b.) because I know not how much of it might have been cut off; nor Situation of the *Uterus*, because the Body lay supine, and I was obliged to take the Assistance of Butchers at the taking it out. The *Vagina* was very small and narrow, not admitting above two or three Fingers. Its Inner Surface was whitish, and moistned by a certain kind of *Mucus*, and all full of *Plicae* or Wrinkles.

The *Bladder* is rounder than that of an Oxe, and much larger than Dr. *Moulins* would have it; for he says, 'tis much about the size of an Ox Bladder; but I find, when inflated, it can contain six or seven *English Gallons*: And I doubt not but I might have stretched it out larger, had I had sufficient Instruments for inflating, for this I only did with my Mouth and Tube. 'Tis indeed very strong, and the Vessels appear very prettily dispers'd through the Tunicles, which I could have easily separated, but did not design to lose it. The Ureters were about $\frac{1}{2}$ of an Inch Diameter, and I could have easily discover'd their Insertion, if I had not designed to preserve the Bladder. Both *Uterus* and Bladder were involv'd within a Duplication of the *Peritoneum*, so that I had much ado to get them separated.

Since I have gone so far in giving an Account of the Parts for Generation in the Female, I hope it will not be unpleasing, if I give Dr. *Moulin's* Account of them in the Male, with my own Thoughts about them.

' In searching for the *Testes*, he found two Muscles very like them, which he suppos'd to have been them, till he had trac'd them to the inner and lower side of the *Ischion*, where he found them implanted: He trac'd the Tendons likewise, and found that when they had gone singly near upon 4 Inches, they join'd

Musculi duo⁶ in one, which went directly under the middle of the *Penis*,
 Retractores⁶ and reach'd beyond a Crookedness he observ'd in it. This
 Penis D.⁶ was in length about 8 Inches, and terminated within 6 or 7
 Mouling.⁶ Inches of the *Glans*, having expanded itself into a Membrane.
 Pag. 15.⁶ There was beside these a Nervous Body, that began underneath
 near the aforesaid Tendons; about 8 Inches from the Root of
 the *Penis*, and reach'd (distinct from the Yard) 9 Inches, be-
 fore it was inserted again in it, at a place $5\frac{1}{2}$ Inches from
 the *Glans*.

Their Use.

He is of Opinion, these Muscles in that Nervous Body be-
 ing so conveniently plac'd for that purpose, that the *Elephant*
 is a Retromingent and probably Retrocoient Animal. The
 crookedness and bending downwards he observ'd in the *Penis*,
 somewhat short of the end of the Tendon, and the confession
 of those that were his Attendants, who told him, that when
 the *Elephant* would make Water, they observ'd him to unsheath
 the *Penis*, and bend it backwards, and so Piss between his
 Legs outwards, confirm'd him in that Opinion; by which,
 he says, Nature seems to prevent this unweildy Animal's wal-
 lowing in its own Excrements.

*Remarks
 upon his
 Observations.*

Had our Author had the good Fortune to observe the *Erectores*
Penis, as well as its *Retractores*, it might have been of Service:
 For admitting there be such, (as I have no reason to call so
 Ingenious a Gentleman's Authority in question) 'tis probable
 there must have been *Erectores* also, and that upon the following
 Accounts. First, because 'tis requisite the *Penis* of the *Elephant*
 be freed of this Retraction; that whereas it is brought back at
 the *Minclut*, it may be brought forward at the *Coitus*. 2dly, Be-
 cause it is requisite that the *Penis* at the *Coitus*, be brought (if
 not altogether, yet) obliquely upwards: As we see when a Horse
 Pisses, he first unsheaths the *Penis*, which by its own Gravity de-
 clines, and if assisted by a more than ordinary Supply of Spirits,
 it tends a little forward; but in the *Elephant* there is always a
 Supply of Spirits required at the *Minclut*, both to make the
Penis penetrate the Sheath, (whose inner Orifice, as our Author
 says, was shut so close, that there was not room for a Man's little
 Finger to get in, so that he was forc'd to divide it before he
 could come at the Yard) and endue it with a certain Rigidity,
 and to swell the *Retractores*, whereby the *Penis* being render'd
 a little stiff, may be drawn back. Supposing then there be such
Erectores Penis, we must likewise conceive them to be of a far
 greater

greater force and bulk than the *Retractores*; for if, as according to our Author, the *Penis* at the *Minctus* be brought back far beyond the usual Posture of the *Penis* in other Animals, we may believe it also to be endued not only with Antagonist Muscles to these *Retractores*, whereby to bring the *Penis* to such a Posture as we see in Horses, but also to make it ascend so far as is requisite for the *Coitus*. And if what I have elsewhere advanc'd be not sufficient to prove this to be no Retrocoient Animal, I shall add the following Arguments: First, The *Vagina* is not plac'd behind a little below the *Anus*, as in a Mare, but below, in a direct Line with the rest of the Belly, whereby there is a Necessity for the *Penis* to ascend. 2dly, The *Ossa innominata* ascend obliquely, which must oblige the *Penis* to do so too. 3dly, The Author's Account of the *Penis* itself, (for he says 'tis bigger than that of a Horse, but not so long) so that it can hardly be suppos'd both to bend backwards, ascend again, and enter the *Vagina* so far as is requisite.

The *Testes*, he says, were not contain'd in a *Scrotum* or Cap- His Account
 ' *sula*, but lay in the *Perinaum*, close joined on each side to the of the *Testes*-
 ' *Penis*. They were neither of the usual shape, bigness, nor in-
 ' cluded in a *Processus* of the *Peritoneum*. Their Shape was very
 ' like that of a Chestnut. They were thicker on the side that
 ' grew to the *Penis*, than on the opposite. They were flat and
 ' round, and not suitable to the other Parts of his Body, being
 ' no more than about 3 or 4 Ounces in weight. They were
 ' joined to the *Penis* by a great many, at least 100 Seminal Tubes,
 ' which may be properly call'd *Vasa deferentia*, and which depo-
 ' sited the elaborated *Semen* in several *Rhomboid Cells*, plac'd in
 ' the Body of the *Penis*, which in this Creature was the com-
 ' mon and only Repository, where the Seed could be found.
 ' These Cells were turgid with Sperm, and so were the Tubes:
 ' The latter were very large, receiving a Block-Tin Wire of an
 ' equal thickness with the biggest ordinary Pins, or above an
 ' Inch, when the Tube was streight, as most were; but being
 ' pursu'd further into the Body of the *Testes*, they became smal-
 ' ler and smaller, till they disappear'd. The Blood came into
 ' the *Testes* by the *Vasa deferentia*.

Our Author, as he proceeds, is somewhat perplex'd; and therefore I chuse to continue in his own Words, that you may the better know his Thoughts of this part. He says, ' Though these were small and disproportionable, yet he took them to
 ' be

' be the *Testes*, nothing else outwardly appearing that contain'd
 ' Seminary Vessels; until he understood by the Curious and
 ' Learned Dr. *Needham*, that his Description of the *Testes* of the
 ' *Elephant* did agree to the *Prostata* of a Bear: Upon which he
 ' mistook the *Testes* for the *Prostata*, there being a great Re-
 ' semblance between these Animals; and having found two Sub-
 ' stances betwixt the Kidneys and Neck of the Bladder, which
 ' might very well be *Testes*, and which, till he discours'd that
 ' Ingenious Gentleman, he did not know what to make of. And
 then he proceeds:

Vena Pre-
 parantes.

' The *Vena Preparantes* were large: He divided that which
 ' was inserted into the Emulgent lengthwise; and within a lit-
 ' tle more than an Inch of its Insertion he found many Valves,
 ' to the Number of about 8 or 10, of divers Shapes, all fitted to
 ' hinder the return of the Blood into the variously divided Sper-
 ' matick Vein, which here from 8 or 10 Rivulets became one
 ' great Channel. Within about an Inch of this, and somewhat
 ' more than two from the Kidneys, he found a Substance of
 ' the Shape of a Pear, but near three times the bigness of a ve-
 ' ry large one. He was at a loss to know what this might be,
 ' and confesses he can give but an imperfect Account of it, since
 ' the Butchers cut it out, and so its Continuation with the *Te-*
 ' *stes*, *Penis*, and other Parts, could not be discovered.

' What he observ'd in it was, that the Spermatick Vessels
 ' entred but a little way into this Substance; but below the
 ' middle of it he found them more deeply plac'd, and their
 ' Branches grew so small, and less numerous to the Sight, as if
 ' here the Veins began. The inner part of this Substance look'd
 ' of a palish, but somewhat muddy red Colour. 'Twas very
 ' Spongy, not much more compact than the Lungs of young
 ' Animals. He doubts not but this Substance was designed to
 ' prepare the *Semen*; but by what Vessels it was brought to the
 ' *Penis* or any other Repository, (itself containing none) he could
 ' not discover; neither could he find any peculiar Vessel, or
 ' *Ductus*, or any thing that resembled that before-mentioned
 ' Substance, by which he might be directed in his Enquiry. It
 ' lies lengthwise from the Kidney to the *Testes*, with the biggest
 ' end lowest. He is of Opinion, from what he has heard from
 ' Dr. *Needham* of these Part, that these two Pear-fashion'd,
 ' now describ'd Substances, were *Testes*; their Place, Size, Fi-
 gure,

gure, and occasional Cutting the *Vasa deferentia*, being the Occasion of his former Ignorance in this Point.

He could observe no *Vesicula Seminales*, nor any common Receptacle for the *Semen*, except the formerly mention'd Rhomboid Cells in the *Penis* itself; but doubted not there might be some still, tho' his being intent upon other things made him neglect the Discovery of them. Thus He, as you find, ingenuously confesses his mistake of the *Testes* twice, and he leaves them in doubt the third time: However, this may serve as a Precaution to such as may have occasion to dissect such a Subject as this hereafter, and therefore I thought fit to give you his Account in his own Words.

The *Intestines*, *Uterus*, and *Vesica*, being extracted, I laid aside the two last, in order to a future Preparation, and went to extract the Liver, which you know takes time in other, and much more in this great Animal. Whether by the haste made in taking it out, or not, the Liver of this Subject had any such *Membrana Hepar investiens*, as Dr. *Moulins* speaks of, I shall not be too positive; but am ready to believe it had none, and that the *Membrana* mention'd by him is nothing but the proper Tunicle of the Liver, raised by Fire, as we shall see hereafter; and my Reason for thinking so, is, that I was very careful to have it taken out whole. 'Tis true, the *Intestines* being taken out in haste, I had not so soon an opportunity of observing the *Ductus Communis*; but I viewed the rest of the Liver exactly, and caused the Figure and Dimensions of it upon the Place to be took, (being 36 Inches long, and 22 at the broadest part) because it would not keep. I was indeed in great doubt, what to think of the *Vesicula Fellea*, when I did not find it. Both the *Vena cava* and *Porta* were very large, and had their *Exit* and Entrance in the concave Part of the Liver, as you see. This had only one Lob; but both the Veins dispers'd themselves, first into two large Branches, and then were subdivided there, as in the ordinary manner: I open'd several, and found them differ in nothing from other Animals; the Substance being firm, as is usual, and *Glands* large and conspicuous; the external Surface smooth, and its proper Tunicle firmly adhering to the *Glands*; which is all I observ'd in it. See the Figure.

Tab. 4. Fig. 10.

But because Dr. *Moulins* does tell us of a *Membrana Hepar investiens*, I shall give you his Account of it; as also of the *Bile* and *Porus biliaris*, which I can give no Account of my self. He says,
“The

‘ The Membrane that invested the Liver, was raised from it
 ‘ a considerable way, as if it had been joined to it. Though
 ‘ this Membrane seem’d to be whole, and look’d like the *Cuti-*
 ‘ *cula* raised by a Blistring Plaister, yet there was no *Serum* con-
 ‘ tain’d in it; and where it seem’d to be intimately joyn’d to the
 ‘ Liver, by a gentle pull it came off, without tearing any thing
 ‘ that I could take notice of, as if it had been but very slightly
 ‘ fastned to the Liver; or rather as a Bag, which contained and
 ‘ exactly fitted it. He takes the use of this to be chiefly to ter-
 ‘ minate the Capillary Vessels, and prevent the gleeting of Serous
 ‘ Humours; and concludes, that he must wholly impute the clear
 ‘ in some Places, and in others that easy Separation of the Mem-
 ‘ brane from the Liver, to the Fire: By all which this seems to
 ‘ be nothing different from the proper Membrane which I observ’d,
 ‘ and you see the Circumstance of firmly adhering and loosely in-
 ‘ vesting.

His Ac-
 count of the
 Bile.

The *Bile*, as he gives an Account, was deposited at the end of
 the first Gut, $4 \frac{1}{2}$ Inches below the *Pylorus*; from whence he
 trac’d the *Ductus Communis* to the Liver, to see the *Vesicula Fellea*;
 but it was wanting, and in the place of it he found the *Porus*
biliarius coming out of the Liver, as the *Ductus hepaticus* usually
 does. He observ’d likewise, that the *Bilis* found in that, differ’d
 both in Colour and Consistence from that he found in the *Ductus*
hepaticus; for the latter was of a clear light yellow Colour, con-
 geal’d like a Jelly, and the former of a dark Green, and some-
 what more fluid than the Gall of an Ox. He hopes Time will
 discover such a difference in the Galls of most Animals, and that
 discerning Men will be excited to find out their Uses.

I fail’d also to observe the *Pancreas*, because it was taken away
in Cumulo, with the rest of the Intestines; and therefore shall give
 you Dr. *Moulin*’s Account of it too.

Of the Pan-
 creas.

‘ The *Pancreas* was very long and large; for it reach’d from
 ‘ about the middle of the Stomach to the *Jejunum*, which space
 ‘ could not be less than 6 Foot. ’Twas a *Glandula Conglomerata*,
 ‘ as the *Pancreas* always is, and had its *Ductus* so wide, that it
 ‘ could without force contain ones little Finger. It open’d into
 ‘ the Gut, where the *Ductus felleus* did. Whether both the Pas-
 ‘ sages join’d into one before their Aperture into the Intestines
 ‘ or not, he has forgot. The *Succus* in the *Ductus* was not limpid,
 ‘ as it usually appears, but of a very dark Green Colour, and yet
 ‘ very fluid, seeming to contain no viscusous Phlegm.

The

The *Spleen*, of which I had not time to take the Figure, was Of the in this Subject $3\frac{1}{2}$ Foot long: On the backside its Edge was *Spleen*. somewhat curv'd, almost in Shape of an unbended Bow: On the fore-side, from a narrow Point at each end, it enlarg'd itself by degrees, till it came toward the middle where the Vessels entred, where it was broadest. Whether the *Vena Splenica* went forth by one, two, or more Orifices, I cannot positively determine, it being cut off in haste; and when cut off, I saw it ragged for the space of 4 or 5 Inches; which I conceive to be because of the Orifices of so many Veins. It was thin and flaccid; what Blood was press'd out of it, was blacker than any I had seen throughout the rest of the Body. If it had not been unwarily cut by several slashes of the Butcher's Knives, I design'd to have blown it up and prepar'd it. I cut off a little of it, and press'd out of it Venal grumous Blood from several of its *Cellules*. It was in breadth from 3 Inches toward the Extremities, to 8 Inches about the middle.

The *Glandule Renales* were plac'd after the usual manner: They were about 5 Inches long, 2 Inches broad, and Oval, with a loose outer Coat, which I remov'd, as it had been a Sheath; within which was contain'd the *Gland* itself, being divided into several Lobes, like the Kidney of an Ox; from whose Interstices there pass'd several thin *Membranes*, which passing to the loose *Vagina*, kept it fast; and by which this *Vagina* was only coherent with it. Its Vessels were cut off so short, that I could make nothing of them. I cut it longitudinally, and found in it a Cavity, which could contain about 2 Ounces, all full of a black grumous Blood, in Colour much like that I observ'd in the Spleen. I shall not much insist upon the Use of these two *Viscera*, about which there is so much debate; but only tell in short, that it is probable, as the Spleen is to the Liver, so are these *Glandulae Renales* to the Kidneys; that is to say, whereas the Blood after it is distributed into the Intestines by the several Arteries, which proceed from the *Aorta*, is receiv'd by the Orifices of so many Veins, as serve to make up so many *Radices Vena Porta*; it is convenient this Blood should be animated by a new Supply of Spirits, the better to enable it to continue its Circulation in the *Porta* through the Liver, and dispose it for the better Separation of the Bile; for which Use the Spleen seems to be adapted, both from its Situation in respect of the Liver, the Venal Blood of the one entering the *Porta* for the other; its Structure; *Mora* of the Venal Blood,

after discharg'd from the Arteries; and a considerable Branch of a Nerve furnish'd to it: So the Kidney being a *Viscus* where there is a vast Separation of *Serum* required, these *Renes Succenturiati* seem to be design'd for furnishing a new Supply of Spirits to the Venal Blood, after it has pass'd the Kidneys, and undergone this Secretion. Both which Uses I doubt not may appear from their Structure, as you have it at large declared by those accurate Anatomists, who have flourish'd in this Age.

Kidneys.

The *Kidneys* were of a large and proportionable size, being one Foot in length and $\frac{1}{2}$ Foot in breadth of the usual Figure, much like that of a Man; their external Surface smooth, and equal with their external Coat, closely adherent to the inner Substance, without any perspicuous Lobes to be seen externally; but when I open'd one of them, I perceiv'd 6 large *Carunculi Urinarii*. Its Substance was very obvious, and correspondent to the Structure usually observ'd in the Kidneys; i. e. the Glandulous Substance externally was very conspicuous, for the space of about $\frac{1}{2}$ Inch in Circumference; then began to appear the *Tubuli Urinarii*, first smaller and less obvious; then another Series larger, and a third still larger, till they began to surround each of the *Carunculi*, like so many Rays of the Sun. I had no Assistance of Microscopes, (for I open'd it in the Field on *Monday*) and therefore did not see so clearly the Coalition of the smaller *Tubuli* into the larger Ducts: But as it happens in all these Excretory Vessels, they did not appear branched and divaricated, as Blood Vessels usually are; but continued parallel to each other, till from the lesser to the greater, they at last emptied themselves into the common Receptacles. I am not positive, whether there was one common Ureter, into which all the six *Carunculi* did empty themselves, or if each had a particular Branch of an Ureter, into which they were discharg'd; only I remember I saw no *Pelvis*, which for the most part happens where the *Carunculi* are very large. The Reason of my uncertainty about the Ureters, is, that after I caus'd the *Thorax* and *Abdomen* to be open'd on the *Saturday*, I let alone the Kidneys till the *Monday*; but they being involv'd within a Duplicature of the *Peritoneum*, and no Fat surrounding them, that Membrane was so dry'd up and stiff, that even the Butchers Knives were scarce able to pierce it: So that requiring the help of a Butcher, who assisted at the Excarnating of the Bones, he took out the Kidneys without any regard to the Vessels; for the *Renes Succenturiati* were luckily taken out the
Day

Day before, when all the Parts were soft and flexible. And here in general I must tell you, that the Flesh of this Animal was for the most part so strong, that no Launcet I had, how keen or strong soever, could do any Service: So that I was forc'd to make use of Butcher's Knife, when I could not admit of their Hands; and how unfit such Instruments are for Anatomical Preparations, I leave you to judge.

I come next to the *Thorax*; where there was scarce any thing remarkable. I think I need not tell, that the *Viscera* here were large and strong. One of the Lobes of the Lungs was open'd by the Butchers, and the other had nothing observable, but its bigness, which was proportionable enough. It did not adhere to the Ribs, as in Dr. *Moulin's* Subject; but lay flaccid on the one side of the Heart, as the other had done, before it was mangled, on the other side; so that I look upon this Adhesion of Dr. *Moulins* to have been in a morbid State. At first I designed to have taken out the whole *Viscera Thoracis*, till the Butcher prevented me; and as I began to direct him between the two first Ribs, I saw two large Glands, one situated on the outside of each of the *Carotides*, as they pass'd out of the *Thorax*; they were round, and near the bigness of a Turkey Hen's Egg, each having a conspicuous Artery inserted, and a Vein passing from them. These I took to be the *Thymus*; which, tho' seldom observ'd in adult Subjects, yet perhaps may at all times be seen in such a large Animal as this. I cut off one of them with part of the adherent Artery; and could observe nothing at the opening of it, but several loose thin Membranes without, which I suppose to have supported and contained in the Cavity (whose sides they describe as they run to and fro) a great deal of Fat, when the Animal was in good case; and a firm glandulous Substance within, without any Cavity. I shall not positively determine, whether these were actually the *Thymus*, or only adventitious Glands; but because they were regularly situated, which seldom happens to adventitious Glands, 'tis probable they were. Their Vessels were proportionable to their bigness, but I can say nothing to their Use. When I saw I could not extract the *Viscera Thoracis* whole, I trac'd one of the Branches of the *Aorta ascendens* down to the Heart; and was surpriz'd, when I cut it above, to see a fat-like Substance jeat out of it; and pulling it, I got upwards of 2 Foot in length of a *Polypus* adapted to the Capacity of the Artery, which was about $2\frac{1}{4}$ of an Inch Diameter. This *Polypus* was no

Thymus.

A Polypus in the Aorta.

wife fibrous, but as it were so much Fat moulded after such a manner, being not unlike the Blade of a broad Sword, near to $\frac{1}{4}$ of an Inch at the middle, and much thinner at the Edges, tough and flexible, with some grumous Blood not so firmly compacted at the Extremity.

Heart.

*Polypus
Cordis.*

When I came to the *Heart*, I saw all its Vessels very large; the *Evium Aorta* very considerably thick and strong. There was nothing about the Heart remarkable, except the bigness, which was proportionable to the Body. The *Auricles* were large, and the Left as well as the Right full of grumous Blood. At the opening of the *Ventricles*, I found them both fill'd with the same *Polypus*; which strangely twisted itself in among the Valves, both *Tricuspides* and *Semilunares*, and also among the fleshy Columns at the bottom of each *Ventricle*; which here seem'd to be so many little strong round Muscles, some $\frac{1}{2}$, others $\frac{1}{3}$, and others near one Inch long, with a round fleshy Belly, and two Tendons variously situated, as you see in the Hearts of other Animals. These *Polypus's*, from a massy Substance in the middle of the Ventricle, sent forth to all Parts their Branches, which here and there twisted themselves round these fleshy Columns, their tendinous Insertions, and the tendinous Fibres of the Valves, with a wonderful Intricacy. In a word, there was no Angle, no Corner or Cavity, which the *Polypus* did not occupy: And yet so much was it disengag'd from the Substance of the Heart, and 'twas so strong and tough, that by pulling its grosser part in the middle, all the other Branches mov'd; and by cutting a few Parts of it, where it was most engag'd, and where the fleshy Columns were thickest, I got it out altogether; and having stretch'd it out, did pleasantly behold these Ramifications, proceeding from its grosser part like so many Thongs or Laces whereinto a piece of Leather had been cut, some broad and some narrower; but none very thick; of a yellow Colour, and fat Substance; each of them weighing 1 lb. which I may safely say, was more Fat than was upon all the Body beside. From whence I may reasonably conclude, that altho' it had not met with the formerly mention'd Hardships, however it might have liv'd sometime, yet it could not live long, it being evident, that this *Polypus* would at length have prov'd its Ruin.

The Mouth

Having, as I told you, but little time to take Notice of the external Parts of the Head, either in respect of the Muscles which move it, the *Larynx*, *Pharynx*, or Tongue, or in respect of the Salivatory

Salivatory Vessels, which empty themselves in the Mouth; I shall only tell you, that the Mouth is very little and narrow, in proportion to the Body, and that upon these Accounts: 1. Because neither Lips nor Teeth are employ'd in gathering the Food, as in other Quadrupeds; so that the Mouth only serves to receive the Aliments from the *Proboscis*, which both gathereth and conveyeth them into it. 2. The *Dentes Maxillares* are of such a thickness, both in the Upper and Lower Jaw, but especially the latter, that they serve to render the Mouth narrow; nor need it be broader, because the Strength of the Grinders is such, that that they can at once render the Aliments so small, that there is no need for the Tongue to move them to and fro' in the Mouth, in order to have them further masticated, as in other Animals; therefore is the Tongue small, short and round, terminating in a Point, thick, and not thin and flat as in Oxen, with a soft smooth Surface, without any perspicuous *Papilla*; by which it seems not to chew the Cud.

The short View I took of the Tongue hindred me from observing that singular Structure mention'd by Dr. *Moulins*. All I took notice of peculiar to it, was the firm Adhesion of the *Thyroïdes* to the *Os Hyoides*, which made me separate and preserve both; whereof see the Figure. As to what Dr. *Moulins* says, it *Tab. 4. Fig.* seems to me very improbable; and I am sorry the Head should have been so mangled at the cutting off, that I was neither able to receive, nor to give you any satisfaction about it. However, I shall give you his Account, and acquaint you with my doubts.

The Passage, says he, to the Ventricle, was through a peculiar Hole, near the Root of the Tongue, and exactly in the middle of that part; which Hole was the beginning of the *Œsophagus*: There was no Communication between this and the Passage into the Lungs, contrary to what happens in other Animals; for the *Membrana Pituitaria anterior* reach'd to the very Root of the Tongue, below the *Œsophagus*; so that it could emit no Voice by the Mouth, but by the Trunk. This *Membrana* had many Passages for the *Saliva* usually separated there. There was between the end of the *Proboscis* and the *Larynx*, a *Membrana Pituitaria posterior*, which had many of the same sort of *Ductus*.

This, I confess, seems to depend upon particular Observation, and yet I cannot see how it can well happen; for every one is sensible, that the *Larynx* occupies the fore part, and the *Œsophagus*.

An Observa-
tion of Dr.

concerning
the Passage
from the La-
rynx to the
Proboscis.

phagus lies behind between the *Vertebra* and *Larynx*. Now how the *Esophagus* can lye thus behind, and yet have such a Communication with the Mouth, as to hinder the *Larynx* from communicating with it, also is to me a very great doubt.

Remarks upon the foregoing Observation.

He proceeds; 'The *Aspera Arteria* was very large, and destitute of an *Epiglottis*, there being no danger of any thing falling into the Lungs from Eating and Drinking, seeing there was no Communication between the *Esophagus* and it. Here the difficulty still remains; for how can Aliments be ingested into the Mouth, and not pass over by the *Larynx*, as is said, before they enter the *Esophagus*; that would imply, that the *Esophagus* lies before, and the *Larynx* behind, which would quite invert all the Rules of the *Oeconomy* of Animals: Since then the *Esophagus* must have in its descent pass'd in betwixt the Head and Lungs, and then penetrated the *Diaphragma* or otherwise, and after it had descended a little, must have turn'd aside and pass'd behind the *Larynx*, as the *Arteria Iliaca* do over the *Vena Iliaca*, which, tho' by cutting off the Head, I could not observe, yet is what seems improbable to me; because then at the Deglutition, by the Pressure of the *Esophagus* on the one side, and *Vertebra* of the Neck on the other, ever and anon would the Animal be oppress'd with a difficulty of breathing when it took Food.

He says further: 'To the outside of these Cartilages he found another grow, which was fastned to them, but so as to be capable of moving up and down, by the help of some Muscles which were implanted in it. 'Twas strong on both sides of the *Aspera Arteria*; but opposite to the *Esophagus*, or on the under-side it was very Limber. This wanted about $2\frac{1}{2}$ Inches of coming round the aforefaid Cartilages, (*viz.* the *Cartilagine Arithmoides*, which made a *Glottis*, in length about $3\frac{1}{4}$ Inches, and in breadth about $1\frac{1}{2}$ Inch about the middle, whose Aperture was somewhat Oval) on the upper side, or that next to the *Esophagus*. This seem'd to supply in some measure the want of an *Epiglottis*, in lessening the *Glottis*, to prevent the creeping of Animals into it.

The Head.

Being come to the Head, I have very little remarkable to add in this Place: For the Brain itself very little differeth from that of an Human one, except in bigness, and somewhat in Figure; the other being somewhat Oval, and this more round. The *Dura Mater* was a strong thick Membrane, every where disengag'd from the *Pia Mater*; which together with all the Substance of the

the Brain, was much more tender, soft, and flaccid, than could have been expected. Whether this proceeded from keeping the Head 2 or 3 Days after the Animal dy'd, before it was dissected, the Weather being then very hot, or from the languid Distemper whereof it dy'd, I know not. Its Substance, Ventricles, and other Parts, were the same as in other Animals. The *Cerebrum* had three large Productions at the *Basis*, one anterior, from whence the Nerve *Olfactorij* proceed, and two lateral on each side of the *Cella Turcica*, reaching from the *Processus Petrosus* behind to the above named Production before: For the Blood Vessels and Nerves, which enter in and proceed from the Brain, we shall discourse of them more particularly, when we come to the Holes of the Skull. I must not forget to tell you, that at the opening of the longitudinal *Sinus*, there were also *Polypus's*, which proceeded from the Orifices whereby the Blood emptieth itself in the *Sinus*.

Thus far the Anatomical Account of the softer Parts of this Animal; which I acknowledge to be deficient in many things, and those considerable. I rather chose to give you a lame Account of what consisted with my own Knowledge, than intrude upon you meer Conjectures for positive Truths, in order to render it more compleat.

I come now to the Fifth Thing I propos'd, wherein I hope to be more happy, as having more time to consider the Bones than formerly I had to Survey the softer Parts; and doubt not to render this Description satisfactory to such as shall be willing to know more particularly the Structure and the Parts of the Bones of an *Elephant*. The Animal is big, the Bones large, and there be several things to be consider'd in them, which do not readily happen in the *Osteology* of other Animals; therefore I hope you will excuse me, if I prove more tedious than might be wish'd. My chief design is to satisfy your Honourable Society, your self, and *Tentzelius*; and if I do that, I have my aim.

I shall begin at the Head, as is usual in *Osteology*; where I shall first take Notice of its External Shape in general; next give an Account of the Bones whereof 'tis compos'd; and lastly, give you a particular Description, first of its External, then of its Internal Parts; shewing their particular Dimensions and Weight, and ascribing their Uses to each of them as they occur, and as we can probably conjecture.

The

A brief De-
scription of
the Skull.

Tab. 2.

The Head (A.) being compos'd of the Bones of the Upper and Lower Jaw, on its upper Part is almost round, having two Eminencies with a Depression in the middle before; which Depression, as it runs back, becomes a deep *Sinus*; and these Eminencies drawing nearer to one another, and as they ascend behind, inclining obliquely forward, are not unfitly compar'd by Mr Ray to a Man's Buttocks: About its middle part it is almost Quadrangular, being flat before, till it comes to the Root of the Trunk (a.) where it is depressed, for the more convenient Lodging of the *Proboscis*, till it has past over the Mouth (b.) At each side 'tis much contracted for the moving of the Muscles of the Lower Jaw (c.) at its back Part it becomes very narrow, with several Eminencies, *Sinus's* and Holes; of all which in order. At its lower and fore part, the Bone of the Palate is narrow, where the *Proboscis* hangs over: On each side of which are the *Alveoli* for the Tusks; and behind, the Lower makes up all the rest of the Head, as to its External view.

Description
of the fore-
part of the
Skull.

Tab. 3. Fig.
1.

We shall begin the particular Description of the External Parts of the Head at its fore-part; the Diameter of whose upper part is 3 Foot, the two Eminencies are almost round (d. d.) and the *Sinus* in the middle is 10 Inches from the right to the Left, and 2 Inches deep (e. e.) from thence descending 5 Inches, the Bone is flat before, and begins to form an Angle on each side for the Cavity, which contains the Muscles of the Lower Jaw and *Proboscis*, between which Angles 'tis 11 Inches (f. f.) thence descending gradually the Angles tend outward, till they come to the upper Production for the Orbit of the Eye (g. g.) where they are 17 Inches; betwixt which is situated the Hole for the Root of the Trunk (a.) This Hole runs across the Head, being from the Right to the Left 12 Inches, and from below to above on each side 7 Inches: for in the middle it has a Protuberance where the *Cartilaginous Septum* arose, which descends 2 Inches, and terminates in an obtuse Point. Within this Hole are to be seen several of the *Lamina*, whereof the *Cellules* which run betwixt the two Tables of the Skull are compos'd (h. h.) of which hereafter, with the *Vomer* in the middle (i.) whence the *Septum* of the Trunk arises. 'Tis pretty thick here, and is compos'd of two *Lamina*, with a spongy Bone in the middle. At its upper and fore part it communicates with the *Os cribosum*; and you may see the several Perforations, through which a great many Branches of the *Nervus Olfactorius* pass, and cover the Surface of the *Cartilaginous Septum*.

turn. At its lower and back-part, where it becomes gradually thinner, it divides the *Choana* into two ; whereof hereafter. At the lower part of this Hole the Bone becomes Concave (k.) so that measuring from the middle of the Orbit of the Eye on both sides, which are $3 \frac{1}{4}$ Inches distant, the Depression becomes 2 Inches deep. At the middle of the lower part of this Hole begins a Suture, which runs down to the extremity of the Bone (m. m.) These two Bones are articulated *per Symphysin*. Dr. *Moulin* calls these *Ossa Maxilla Superioris*; but I rather incline to call them *Ossa Palati*. They are 5 Inches broad at the upper part, where they are articulated with the *Ossa Maxilla Superioris*, by Dr. *Moulin's* *Ossa Mala*, by the same kind of Suture (n. n.) From the upper part to the lower extremity of this *Ossa Palati* (b.) it is 15 Inches. After they have quitted the *Ossa Maxilla Superioris* on each side, they run down with an obtuse Angle; being Protuberant on their outer side, they incline gradually toward the Suture in the middle (m. m.) forming a Cavity $2 \frac{1}{2}$ Inches deep at the lower extremity, which is not so deep as at the middle. 'Tis design'd for the *Proboscis* to rest upon, and the Eminencies on each side are for granting space for the *Alveoli*; whence the Tusks proceed (o. o.) which are improperly call'd Teeth, (and therefore this Bone which contains them should not be call'd *Ossa Maxilla*) since they only serve for a Defence to this Animal, and should rather be call'd its Horns. They are of different bigness in different Animals, and the Male seems to have them bigger than the Female; v. g. The *Elephant* which was burnt at *Dublin*, had them much bigger than this which died here; which consists with the Knowledge of several in this Place, who remember to have seen both: And the Figure which Dr. *Moulin* gives of them, even tho' broke, seems to represent them much larger than those in the Subject we have; which are very small, not exceeding the bigness of an ordinary Cane, or not above one Inch Diameter, and straight, so far as they remain unbroke: So that I am not in a Capacity to affirm or deny the Assertion of *Aristotle*, who says, *Mares grandiores resimatosque habent, Famina minores, & contra quam Mares, vergunt enim deorsum, pronique deviant*. Perhaps it might have been so with these; and that the Keepers (that the difference of the Sex might not be known, by their bending downward or upward) might have designedly broke them. Indeed there is great difference between the weight and length of these, had they been entire, and those wonderful big ones whereof Authors give us an Account. *Tentzelius* tells us,

H

that

Description
of the Tusks.

that the length of those describ'd by him is 8 Foot; and he, with several others, tells us, that there are of them which weigh 100 Pound and upwards, some 140, others 150, and those he talks of were above 100 Pound; insomuch, that *Tavernier* tells us, that in the *Indies* they make Posts of Doors and huge Pales of them: And 'tis memorable, which he says also, that the *Elephants* of the Isle of *Ceyland* have no Tusks, but the first which the Female produces: And this we have confirm'd by Mr. *Knox* in his Relation of this Island, that few of the *Elephants* there have Tusks, and those only Males. There is a great debate among Authors, whether these shall be call'd Horns or Teeth. Those who would have them be Horns, say; 1st. Because they rise from the Skull. 2. Because they can be polish'd, and brought into any form, which 'tis difficult to do with Teeth. 3. Because they fall off and grow up again, which the Teeth of no Animal do, except of Man. Such as would have them to be Teeth, tell us, that 'tis peculiar to such Animals as have the Hoof divided into two, to have Horns; and that Horns are always cavous or spongy within; whereas these are altogether solid. For the first Reason, that they rise from the Skull, tho' it be granted, yet it is after a different manner from Horns; for they always either adhere to the Skull by a certain Articulation, if not cavous, as in Harts, or have a Protuberance arising from it, and filling up their Capacity, if cavous, commonly call'd the Flint. For the second, tho' it be granted they can be polish'd, &c. yet they are not capable of such Alterations, as Horns are by Boiling, or burning in the Fire, such as being made flexible. Indeed they seem more to agree by their Structure with Teeth; for they proceed from the Skull, and are planted in it *per Gomphosin*; having in these we are speaking of a large Cavity, about two Inches long, large according to the Diameter of the Tusks, at first, but as they descend tapering gradually, till they terminate in a Point analogous to the Cavities in the Roots of the Teeth, and filled up with the same kind of Substance, whereby they are kept firm in their Places. And as to their Structure, I doubt not but they have been compos'd of a mucilaginous Substance at first, as Teeth are; and that afterwards they augment by the apposition of several *Lamina*, or *Strata*, according as the Animal encreases in Years. Hence 'tis, that I suppose *Tentzelius* his Friend came to be convinc'd, that those Bones he treats of, were of an *Elephant* 200 Years Old, by such Marks as these *Lamina*, which might have been taken from the Teeth.

Teeth. These *Lamina* are very obvious in the Subject we have, and the smallness of the Tusks seems to be another Argument of her being Young, according to their term of Life. Whether they be call'd Teeth or Horns it matters not much; for if from their Substance we take their Designation, they may be call'd Teeth; and if from their use in pushing, we may call them Horns; and to avoid any debate, let them be call'd Tusks or Defences. They run in this Subject about 6 Inches high in the *Os Palati*, and adhere by a strong Ligament, as is already said.

We proceed to consider the side of the Head. We told, that *The side of* descending 5 Inches from the middle of the Depression in the *the Head.* fore part of the Head, which is 7 Inches from the Top of any of *Tab. 3. Fig.* these Eminences, it begins to form an Angle (*a.*) and the side of 2. the Head becomes considerably depress'd, where the Muscle of the Lower Jaw and *Proboscis* is lodg'd. This Depression from its beginning (*a.*) to the *Os Zygomaticum* (*b.*) (where it is $8 \frac{1}{2}$ Inches deep) is $14 \frac{1}{2}$ Inches distant; and from the fore-part (*g.* Fig. 1.) to the *Orificium Meatus Auditorij* (*k.* Fig. 2.) is 13 Inches; also from the upper Protuberance of the Orbit of the Eye (*f.*) to the Articulation of the *Os Zygomaticum* with the *Os Temporale* (*i.*) is $9 \frac{1}{2}$ Inches. At the fore-part of this Depression is situated the *Sinus* *Sinus for the* for lodging the Eye; for 'tis improperly call'd Orbit, since only the *Eye.* half of the part where the Eye is lodged is boney: It has 3 remarkable Protuberances; one at the upper and fore-part (*f.*) whence a strong Cartilage arises, and is inserted in another 7 Inches distant (measuring obliquely) form'd by the Articulation of the *Os Zygomaticum* with the *Os Maxilla* (*g.*) and a third in the middle (*e.*) at $2 \frac{1}{2}$ Inches distant from each of the former. This Protuberance serves for the Insertion of the *Trochlea* of the *Musculus obliquus major*. The bottom of the Orbit has another *Sinus* (*s.*) which conveys the *Nervus Opticus* to the bottom of the Eye, the upper part whereof is compos'd of a *Lamina* of the *Os frontis*, which lies over the *Os Maxilla*: From beneath this *Lamina* not only proceeds the *Nervus Opticus*, *Motorius* and *Patheticus*, but also a considerable Branch of an Artery, Vein, and 5th Pair of Nerves, which running forward, pass through a large Hole in the *Os Maxilla* (*m.*) and are dispers'd in the *Proboscis*; whereof hereafter. This *Sinus* (*s.*) whose lower side is form'd by a *Spine* running along the *Os Maxilla*, is 9 Inches long, $1 \frac{1}{2}$ Inch broad at the middle, and one Inch deep; but as it comes forward, 'tis enlarg'd as the Globe of the Eye encreases.

The *Os Max-*
illæ Superio-
ris.

Fig. 1.

The *Os Maxilla* is a very irregular Bone. At the fore-part of the Skull it begins with a sharp Point (*p. p.*) having that part of the *Os frontis* which forms part of the Orbit (*d. Fig. 2.*) on the one side, and that part of the *Os Palati* (*m.*) which forms the Hole for the Root of the Trunk on the other; whence running 6 Inches, and inclining inward by a crooked suture, it terminates in a Protuberance; beneath which is a small *Sinus* ascending obliquely to the Hole for the Root of the Trunk (*n.*) fram'd by the Blood Vessels (whereof above) as they go to the nourishment of the Trunk; from thence it runs obliquely backward, and is articulated with the *Os Palati* by a broad squamous Suture. From the middle Protuberance of the *Sinus* for the Eye (*d.*) it runs streight backward, being articulated with that part of the *Os frontis* which forms the aforesaid lower Edge of the *Sinus* for the *Nervus Opticus* (*s.*) for the space of 18 Inches, where it begins to be overlaid with a *Lamina* of the Bone, which forms the upper and back-part; whence it descends 9 Inches, till it comes to the Root of the Teeth (*n.*) where we shall leave it, and return to the fore-nam'd Protuberance; from whence having made up a part of the *Sinus* for the Globe of the Eye, as is said, it runs backward 6 Inches, and is articulated (by a flat Suture (*g.*) which first descends $\frac{1}{2}$ Inch, then runs obliquely backward $2\frac{1}{2}$ Inches) with the *Os Zygomaticum*. At its beginning its $2\frac{1}{2}$ Inches broad; plain on its inner, and convex on its outer Surface; bended, as it descends, like a Horn, and terminating in a Point. From the lower part of this Suture it becomes much thicker; and having fram'd a *Sinus* about 4 Inches long, it runs toward the fore-part of the Skull. From this *Sinus*, as it has returned 3 Inches, is form'd the side of an Oval Hole, which running from before to behind is about $3\frac{1}{2}$ Inches long, and from the one side to the other two Inches. At that side which is fram'd by the *Os Maxilla*, and toward the *Processus Zygomaticus*, 'tis two Inches thick; and at its other side, it runs streight backward from the *Os Maxilla*, in a direct Line, with the great Cavity, which contains the Muscles that move the Lower Jaw and *Proboscis*. This Hole is analogous to that in a Human Skeleton in the *Os Maxilla*, beneath the Orbit of the Eye; and is larger in Quadrupeds, being destinated for transmission of a Vein, Artery, and the superior Branch of the second Division of the 5th Pair of Nerves, which in those go to the Upper Lip and Jaw; but in this Subject, as I have already shewn at large, 'tis probable they serve for the Nourishment and

and other Functions of the *Proboscis*. Tho' it be very observable, and of signal Use, yet 'tis so situated, that I was not capable to give such a View, as might afford a true Idea of it, in any of the Figures of the Head: However, I have mark'd it (*r. r.* Fig. 1.) and (*m. m.* Fig. 2.) (*8. 8.* Fig. 3.) From this Hole the *Os Maxilla* inclines 6 Inches, toward the Root of the Teeth (*n.*) where we leave it, and return to

The *Os Zygomaticum* (*s.*) (*h.*) (*i.*) which, as in all other Animals, serves for a Guard to the Muscles which move the Lower Jaw. In Men, and several other Animals, 'tis form'd of a Production of the *Os Temporalis*, articulated with another from the *Os Mala*, by a particular Suture, call'd *Sutura transversa*; but here 'tis the most distinguish'd Bone of all the Head; for being 12 Inches long and two Inches broad, 'tis articulated with the *Os Maxilla* before, and running backward 6 Inches, it meets at its upper part with a Production of the *Os Calvaria* (*f.*) as we may call it, which accompanies its lower part other 6 Inches, and then terminates in an obtuse Angle. 'Tis loosely join'd with this Production, and 'tis probable, that 'tis capable of considerable Motion, upon the following Accounts. 1. The *Sinus* in the back-part of the Skull, as shall be shewn, for receiving the *Condyles* of the Lower Jaw, are larger than the *Condyles* themselves, by which they have a pretty good space to move from the Right to the Left; and the extremity of the *Os Zygomaticum* being their Guard on each side at the outer part, which way they move, these may be suppos'd to yield. 2. The Lower Jaw is of such weight, that its Muscles must require a great space to act in, and that may be conciliated by the Motion and Yielding of this Bone. 3. The Grinders of the Lower Jaw are much longer than those of the Upper, and therefore they require a greater space to move in, for the better Performance of Mastication, (because the Upper Jaw in this, as in most other Animals, is immovable) to which the Motion of this Bone must very much assist. Add to these, the manner of its Articulation; for it rests upon the Production of the *Os Maxilla* before; and behind it moves, as it were, to and fro, upon the Production of the *Os Calvaria*, which rests upon it.

The back-part of the Skull is next to be consider'd: At its upper part the two Eminences formerly mention'd now appear more considerable, because of the intervening *Sinus*, which from two Inches deep, and 10 Inches from the Right to the Left, becomes

The *Os Zygomaticum*.

Fig. 1.

Fig. 2.

Fig. 1.

Fig. 1.

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Fig. 1.

Fig. 3.

Fig. 6.

Fig. 3:

comes 4 Inches deep; for the Eminences (*a. a.*) approach (as they run backward) much nearer to one another, and the *Sinus* running obliquely downward becomes still deeper, having a *Spina* (*c.*) 6 Inches long and one Inch deep. This *Spina* serves for Insertion of the Muscles, which move the Head. The Bone on each side of it is very rugous; which seems to be an excellent Contrivance, because there is such a deal of Strength requir'd here in the Tendons, for supporting the weight of the Head of this great Animal, 'twas requisite the Surface of the Bone whence they arise should be very unequal, that their Fibres may be the more firmly impacted therein. Here 'tis also that the *Tax-Wax* formerly mention'd was inserted. By means of this *Spina* in the middle, and the Eminences on both sides of the *Sinus*, the Surface of the Bone is much more enlarg'd, and the Muscles with their Tendons are more capable to move the Head, either directly or obliquely to either side, than if the Bone had been plain. After the *Spina* of the *Sinus* is ended, the Bone swells out toward the back-part 3 Inches, and then descends $1\frac{1}{2}$ Inch till it comes to the Hole for the Spinal Marrow (*d. d.*) and here the Bone from above the *Orificium Meatus Auditorij* (*f.*) on each side, becomes Protuberant 10 Inches (*e. e.*) till it comes to the *Processus Condylodes* (*c. c.*) This Protuberance has the same Office as the *Apophyssis Mastoides* in other Animals, viz. for Insertion of the Muscles which bend the Head inward. The *Processus Condylodes* (*c. c.*) are $7\frac{1}{2}$ Inches distant inclusive; each of the *Condyles* being $2\frac{1}{2}$ Inches broad from the Right to the Left, as they arise gradually from their outer side, and from below to above arising (as it were Semicircularly) 5 Inches long. The Hole for the Spinal Marrow (*d. d.*) at the upper part betwixt the *Condyles* is 3 Inches broad, $2\frac{1}{2}$ Inches at the middle, and 2 Inches at the lower part, till at last it terminates in a Point. 'Tis $3\frac{1}{4}$ Inches long, and its Margin about the middle of the *Condyle* is 2 Inches thick. Below these *Condyles* the Bone becomes more flat; insomuch, that tending inward there is a *Sinus* fram'd; above which the *Processus Styloides* arises (*g.*) being there articulated per *Synchondrosin*. This *Processus Styloides* is cartilaginous about one Inch (*h.*) at its Base; whence arising hard and solid 4 Inches (*k.*) flat on its inside, and convex on its outside, being one Inch broad, it is afterwards divided, sending out another Bone $5\frac{1}{2}$ Inches long (*i.*) which bending toward the Scull, but outward from that place whence it proceeded for the space of two Inches, it becomes gradually

gradually smaller, till it terminates in a Point not unlike that part of a Pen wherewith we write. This Bone is so situated in the *Basis* of the *Scull*, that 'twas impossible to give any Idea of it *in Situ*, and therefore I caus'd them to take the Figure of it apart. Betwixt the *Sinus* below the *Processus Styloides* and the *Condyles*, at $1 \frac{1}{2}$ Inch distant, is situated the Hole for the jugular Vein (*m.m.*) through which also passes the *Par vagum* (See *n.* Fig. 14.) which being Oval, is $1 \frac{1}{4}$ Inch long, and $\frac{1}{2}$ Inch broad. On the outside of the *Processus Styloides*, is to be seen the Hole for the hard Portion of the *Nervus Auditorius* (*l.*) This is so near to the Root of the *Sinus*, that it could not be well shewn in the Figure. Betwixt the Origin of the *Processus Styloides* (*g.g.*) and the Hole for the jugular Vein (*m.m.*) is lodg'd the boney part of the *Aqueduct* (*n.n.*) which descends 5 Inches; 'tis $\frac{1}{2}$ Inch broad, and so flat that it could scarce be represented in the Figure. From thence is a *Crena*, whose Orifice is represented by (*o.o.*) where its fleshy part was contain'd, which communicated with the Palate; it descends 3 Inches obliquely inward. From the foresaid Hole for the jugular Vein (*m.m.*) is situated the Hole for the Carotid Artery, which is so large as to admit the Point of ones Little Finger (*p.p.*) Descending in a streight Line from the *Processus Styloides* (*g.*) $3 \frac{1}{2}$ Inches, you come to the Hole where the *Arteria dura Matris* enters the *Scull*, and by which the 3^d Branch of the 5th Pair of Nerves passes out: Here also the Vein, which returns by the great Hole in the *Os Maxillare* from the *Proboscis*, (after it has past some space beneath the *Lamina*, which makes up the upper edge of the *Sinus* for the Orbit of the Eye,) passes out, and runs back to be joined with the jugular Vein. These Holes are situated on each side, betwixt the *Aqueduct* and the *Sinus* for reception of the Lower Jaw (*y.*) and are both receiv'd within a like *Sinus*, so that they could not be represented by an Orifice. The Bone for Reception of the *Processus Styloides*, as I have said, is deprest; and from thence for the space of two Inches, till you come to the Hole for the Carotid Artery (*p.p.*) it is rais'd for the *Aqueduct* (*n.n.*) From thence, betwixt the two Holes, 'tis gradually Protuberant to the *Condyle*: From below this Hole (*p.p.*) streight downward, during the Progress of the two *Aqueducts* (*n.n.*) which are 3 Inches distant, 'tis deprest, till you come to the *Choana*, or Passage betwixt the Palate (*t.*) and the Root of the Trunk (*i.*) Between the two Holes for the *Arteria dura matris* 'tis 6 Inches (*q.q.*) The length of the *Sinus*, called in Human

man Subjects the *Glenoid* Cavity, measuring from that part of it which is toward the Hole for the *Arteria dura matris* (q. q.) till you come to the extremity of the *Os Zygomaticum*, is $5 \frac{1}{2}$ Inches long. This *Sinus* is scarce at all deprest; 'tis rather Protuberant, with a Semicircular Surface from above to below: 'Tis well enough guarded on both sides; so that notwithstanding this Protuberant Reception for the *Condyles*, yet their Dislocation is prevented by the extremity of the *Os Zygomaticum* on the outside (x.) and on the inside, first by an hollowness, and then by a Rising in the Bone. And this Contrivance seems to facilitate the Motion of the Jaw very much; for had this *Sinus* been proportionably so deep (however Superficial it may be) as in Human Subjects, its Motion had not been so very free, as we see it is: For by this half round Surface, the *Condyles* have the more space to move backward, and the Lower Jaw to be deprest, that it may move forward, and press the Aliment against the Upper Teeth with the greater Force; the Muscles also prevent its falling too much back, and the *Os Zygomaticum* its inclining too much to either side, as is observ'd. Above the big Process of the *Os Maxilla*, which is articulated with the *Os Zygomaticum*, is the *Orificium meatus Auditorij* (k.) which being Oval, is one Inch long, and $\frac{1}{2}$ Inch broad. Betwixt this external Orifice and the *Processus Petrosus*, the *Meatus* is 8 Inches long; whereof hereafter. By means of this great *Sinus* on each side, the *Basis* of the Scull is so contracted, that from the Hole (q.) down toward the Root of the Teeth (3. 4.) which is 9 Inches long, the breadth is but $7 \frac{1}{2}$ Inches. From the extremity of the boney part of the *Aqueduct* downward, the Base of the Scull is compos'd of two cavous Bones, about $2 \frac{1}{2}$ Inches thick, and a large *Sinus* in the middle $3 \frac{1}{2}$ Inches Diameter (s.) at the end of the *Sinus* for the fleshy part of the *Aqueduct*, and at the Root of the Teeth $4 \frac{1}{2}$ Inches. This *Sinus*, after 'tis become 2 Inches deep, terminates in the *Choana*. This Passage is 8 Inches long, and $2 \frac{1}{2}$ Inches broad, with the *Vomer* in the middle (u.) extending from hence to the Root of the Trunk 3 Inches. The back-part of this *Vomer* is sharp and thin, but its fore-part thicker, consisting of two *Lamina*. Dr. *Moulins* is of Opinion upon Observation of the Tongue, whereof before, that the *Elephant* only Breaths by this Passage, and not by the Mouth. I do not find that this Passage is proportionally more Patulent in this Animal than in any other, only it seems to be more direct; for as in other Animals this Hole communicates

Fig. 2.

municates with the Root of the Nose, and the Bone gives the Air at its *exit* another direction; so here the fore and back-part of the *Choana* are directly opposite, but then the Trunk itself gives the Air a quite other direction than in the Bones of other Animals. Indeed there is one Argument which seems to strengthen Dr. *Moulin's* Opinion, *viz.* That by the Trunk the *Elephant* sucks up any Liquor it has occasion for, which it afterwards empties into the Mouth; and so by drawing in of the Air, 'tis able to keep in its Extremity any thing it takes hold of. However, the Objections advanc'd against this Opinion formerly, seem to be of greater Moment, than these Arguments here propos'd, are for it. These two cavous Bones on each side the *Choana*, are fill'd up from the two firm, solid, white, weighty Teeth (3. 4.) the *Teeth, or* back one whereof does not grind, but serves, as it were a wedge, *Grinders of* to keep that before firm in its Place (5.) This Tooth runs ob- *the Upper* liquely backward 3 Inches from the fore Tooth. That part of it *Jaw.* which is without the Jaw Bone is half round, being 6 Inches in Surface from its Root on the one side to that on the other, very polite, as *Tentzelius* is pleas'd to term it, and smooth like Glass. How far this Tooth or the other may go up, I cannot positively determine, neither give any Account of the Figure within the Bone, unless I had broke the Scull. However, I shall insist more upon the Teeth, when I come to the lower Jaw; all I shall add at present is, that their *Alveoli*, especially that which contains the hind Tooth, are as thin as can be imagin'd. The length of each of the Teeth is 7 Inches. These Teeth are not alike on both sides; for that on the Right is but one Inch without the *Alveolus*, throughout its whole extent, on the outer side; and on its inner, 'tis one Inch Protuberant at its fore, and two Inches at its back-part; whereas that on the Left side is only one Inch Protuberant before on the outside, and 3 Inches behind, where it forms a kind of Angle, as it is join'd with the hind Tooth; and on the outside 'tis $\frac{1}{2}$ Inch Protuberant before, and 2 Inches behind. The Tooth on the Right Side (2.) grinds with that of the lower Jaw, throughout its whole extent; whereas that of the Left, after it has run back 6 Inches, runs up with an half round Surface two Inches (5.) before 'tis join'd with the hind Tooth. It would seem, that this difference betwixt the Shape, Situation, and Dimensions of the Right Tooth from the Left is not singular here, for Dr. *Moulins* doth likewise take notice of it, in that which dy'd at *Dublin*; for he says, ' The length of the Teeth of the Right Up-
I
per

per Jaw is 4 Inches, but that of the opposite was but 3 : The two outward or fore Teeth of the Upper Jaw, were somewhat longer than those of the Under. He takes no notice whether the hind Teeth of the Upper Jaw grind or not; but here, as I have said, not only both the hind Teeth are free from grinding, but also part of the fore Teeth of the Left side. These Teeth, as Dr. *Moulins* well observes, are all *Molares*, being 2 Inches broad; that part of them wherewith they Grind is $6\frac{1}{2}$ Inches on the Right Side, and $5\frac{1}{2}$ on the Left. Their Surface, tho' flat, yet is very unequal; for they have alternatively plac'd (running from the Right to the Left) an hollowness, and then an Eminency, and this Eminency is surrounded by a rough Protuberant Border. There are nine of each of the Hollownesses, and as many Eminences, undulated, as they use to paint Sea Waves; which seems to quadrate with what Mr *Ray* says, viz. That these Teeth have 8 or 9 parallel undulate Lines in their Surface. The Situation of these Teeth, for what I know, is peculiar to this Animal; for instead of running from above to below, as in other Quadrupeds, they run from before to behind, as in human Subjects. being plac'd at ... Inches distance at the beginning, or fore-part, and ... Inches at their hind part. From the fore-part of these Teeth the *Os Palati* runs down ... Inches, having that division in the middle (whereof formerly) much enlarg'd (10.) This Bone, as to its thickness in this Subject, is correspondent to the Tusks, which are implanted in each side of it, as is said. It seems to be thus plac'd upon two Accounts; 1. That it may answer to the distance, or cover that part of the Lower Jaw which runs betwixt the fore-part of the Grinders above (*c. c.*) and the Process at its lower and middle part (*e.*) 2. That it may afford space, as we formerly observ'd, for the Trunk to rest upon, lest it should be obnoxious to the Mouth.

Fig. 7.

The Lower Jaw.

Fig. 7. 8.

Fig. 3.

The Lower Jaw is the only External Part of the Head, which comes now to be consider'd, consisting of one big Bone, and compos'd of its fore and hind part, and five Processes, viz. two *Condyles* (*a. a.*) two *Processus Coronæ* (*b. b.*) and one *Processus Mentis* (*e.*) 'tis articulated with the Upper Jaw, as in all other Animals, by a double *Arthrōdia*. The two *Condyles* (*a. a.*) are 12 Inches distant inclusive; their Surfaces Convex, both from the Right to the Left, which is $3\frac{1}{2}$ Inches, and from before to behind, which is 2 Inches. They are received into the *Sinus* of the Upper Jaw (*x.*) which, as I have said, is $5\frac{1}{2}$ Inches: So that they have space enough

enough to move at Mastication. The Neck below the *Condyle* is 3 Inches from before to behind at its smallest part, whence descending 3 Inches, it becomes 6 Inches broad (b.) and two Inches thick at its back-part, where it forms an obtuse Angle; whence running forward at its outer side 2 Inches, it begins to form a *Sinus* for Insertion of the Muscles which move the Jaw. This *Sinus* running forward 4 Inches more, terminates in a sharp edge of the Bone, which descends to make up the *Processus Corona* (b.b.) This *Sinus* is 8 Inches from above to below: At the upper part of the *Processus Corona*, 'tis 8 Inches broad from before, where 'tis sharp, to behind, where 'tis thick and obtuse, and at its middle $9\frac{1}{2}$ Inches (b.b.) the *Processus Corona* from above to below 6 Inches, with, as it were, a Semicircular edge, but somewhat more Protuberant, where 'tis not so sharp as the Margin above. How we come to the inner side of the same part of the Bone, where we find that descending 7 Inches from the *Condyle*, till we come a little below the foresaid obtuse Angle, there are the beginnings of a large Hole (b.b.) $3\frac{1}{2}$ Inches long, viz. from the first framing of its *Sinus* to its lower part, and $1\frac{1}{2}$ Inch broad. This Hole is for receiving the Vessels fit for forming and nourishing the Teeth, whereof hereafter: Here the Jaw begins to be about 4 Inches thick behind, being convex in its back-part; whence running 4 Inches forward, it inclines about $2\frac{1}{2}$ Inches inward, where it forms a large *Sinus* for insertion of the *Musculus Masseter*, and whereof no *Idea* could be given in the Figure; for the outside always obstructed the view of the inside. This *Sinus* descends obliquely from the Neck of the *Condyle*, till it comes to the Root of the Teeth (c.) 9 Inches, which space does not appear so large in the Figure, because of the Position of the Jaw; and from the fore part of the *Corona* backward, till the Jaw become thick, $5\frac{1}{4}$ Inches: From the back-part of the Jaw at the foresaid obtuse Angle, till you come to the Point of the *Processus menti* (b.) in a streight Line, is 27 Inches. The Arch of the back Surface from the same Angle, till you come equal with the beginning of the Teeth, or lower part of the *Corona* (c.) is $14\frac{1}{2}$ Inches; from whence measuring outward from the Root of the Teeth, it is 3 Inches to the foresaid lower part of the *Corona*; from thence to the middle of the back part 5 Inches; and from the Root of the Teeth at the External to the same place as the Internal Part, is 16 Inches; and here the Jaw is about 4 Inches thick behind. At the joining of the two Teeth

Fig. 8.

Fig. 9.

Fig. 8.

Processus
Menti.

Fig. 7.

Fig. 7. 8.

Sinus for
lodging the
Tongue.
Fig. 8.

Fig. 9.

streight downward, 'tis $6\frac{1}{2}$ Inches; and here it inclines gradually outward for above 3 Inches; whereas its inner Surface is almost plain, or at least for the space of 4 Inches, and then inclines 3 gradually outward below, forming an Arch in its Progress. Streight downward from the lowest part of the *Corona*, the Jaw is at the thickest (c.) and here it begins to run obliquely forward, till meeting with the same part of the Bone from the other side, it terminates in the *Processus Menti* (h. Fig. 9. 3. Fig. 7.) which about 2 Inches runs obliquely outward, and seems very convenient for defending the Mouth from the Inconveniencies of the Trunk; which by its weight would press too much upon it, were it not defended both by that part of the *Os Palati*, which runs down from the Teeth in the Upper Jaw, upon which it leans; and by this *Symphysis* or *Processus Menti*, h. e. which keeps it still inclining downward, and suffers it not to bend inward: Add also, that this Process may assist the *Proboscis* somewhat in its Elevation, when the Animal bending the Head a little forward, may make the Point push or bear up the *Proboscis* from above it. As the lower part of the Jaw in its Progress forward runs obliquely downward, so its upper part of the Root of the Teeth runs streight forward, or rather inclines a little upward (c. e.) so that whereas 'tis only $6\frac{1}{2}$ Inches from above to below at the joining of the Teeth, now 'tis $7\frac{1}{2}$ Inches streight downward, (and here its Surface is more plain, for before 'twas convex, and as it were half round) but along the edge of the *Sinus* for lodging the Tongue (d. e.) to the outmost point of the *Processus Menti*, 'tis 9 Inches. Now we consider the inner part from the Place where we left it, and find it still more plain; where measuring from below the foresaid joining of the two Teeth streight forward, 'tis 4 Inches on each side, till both meet in a Semicircle (f.) about 3 Inches Diameter at the lower part, and somewhat nearer at the Root of the Teeth. After it has run 2 Inches upward, it runs streight forward with a convex Surface 4 Inches thick; thence it ascends 4 Inches more to the Root of the Teeth (d.) This *Sinus* is for lifting the Tongue, which is very narrow and pointed. Thus having given a particular Account of the External Figure and Shape of the Lower Jaw, we shall consider it in general. The *Condyles* are 12 Inches inclusive distant, whence the Bone running downward, and somewhat backward 3 Inches, forms an obtuse Angle, which is 17 Inches exclusive distant from its opposite; and here the Bone begins to swell to a considerable thickness by degrees

degrees: From thence descending gradually 8 Inches, 'tis 18 Inches distant, thence inclining obliquely forward 8 Inches more, 'tis $14 \frac{1}{2}$ Inches distant; inclining still more forward to the Base where the two Bones meet, the Bone still becoming thinner, 'tis 9 Inches; from which on each side, till you come to the *Processus Mentis*, 'tis 7 Inches: Thus far as to its back-part. Now to its fore-part: First, there is the *Condyle* (a. a.) then there is a sharp Spine which runs obliquely to the *Corona* (b. b.) whence to the Root of the Teeth 'tis thicker and of a Semicircular form: Opposite to this, the Bone begins to swell at its outer side, and becomes plain at its inner; that is to say, as to that which regards the Mouth, and that which doth not. Its Surface on both sides is very polite and smooth, having a great many Holes for immision and egress of the Blood Vessels, which nourish the Bone; and at its fore-part, it has two large Holes for the *Maxillaris inferior* (Z. A.) or Branch of the 5th Pair of Nerves, which are dispers'd at the Roots of the Teeth. Next we come to the inner Substance of the Bones, so far as can be guess'd, because the preserving of the Sceleton entire, has kept me from penetrating so far into the Knowledge of it, as my Inclination might have led me. Every one is sensible, who knows any thing in *Osteology*, as well Human as Brutal, that immediately below the *Corona*, or thereby, there is a pretty large Hole in proportion to the Animal, for the emission of a Branch of the External Carotid Artery, Jugular Vein, and 5th Pair of Nerves, call'd *Maxillaris inferior*, which are dispers'd in the Roots of the Teeth for their nourishment, and for conciliating to them that lively Idea of Pain, which those affected with the Tooth-ach are very sensible of; and that this Hole in Sheep, Calves, and other Quadrupeds, especially such as are young, as also in Children before the 7th Year, and even afterwards for some time, in the cavous part of the Bone, where the Teeth do not penetrate the Jaw, there are Rudiments of Teeth to be seen cavous in that extremity, which is toward the Base, (in which the Ligaments that keep the Root fix'd are firmly impacted) and solid at the other extremity; so in this Animal from the fore-mention'd big Hole, I observ'd several of these Rudiments of Teeth lying *Stratum super stratum*, or rather plac'd perpendicularly across the Bone of each others side, from the Hole (b. b.) till the Teeth began to appear. These that were plac'd nearest the Hole were smaller, not above one Inch in breadth, and $\frac{1}{2}$ Inch in length, i. e. from above to below, cavous,

Fig. 9.

T. b. 22

Maxillaris inferior.

The Rudiments of Teeth.

Fig. 8.

as is observ'd at the lower or back-part, (for reception of the Ligament, which is guarded by two thin hard *Lamina*) and solid at the other. Those nearest the Hole were two or three times intersected by Membranes, whereby they could be disjoin'd. But after I had taken out several, I found no more such a Separation, but that from the Right to the Left, they were wholly cavous: Each of them was invested by a membranous Tunicle, as it were a *Periosteum*, and had something like a Cartilaginous Substance betwixt the two. Their Surface is very unequal at the Orifice, where they receive the Ligaments and Vessels (c.) and as if they had been folded into several *Plicae*, and afterward taken asunder, from which there run several Ridges and *Sulci* (b.) from one extremity to another; where the Ligaments cease, they become extremely solid and ponderous, and at their upper Extremities half round, and sometimes form'd into Digitations (a.) When they approach to that part of the Bone at which the Teeth appear, they begin to quit the *Periosteum*, by which they were distinguish'd, and unite close together, so as to form one Bone. 'Tis observable, that at their upper Extremity there is a *Lamina*, which being Convex toward the Jaw, and Concave toward these Rudiments of Teeth, do as it were knit their solid Extremities together, from which 'tis also separated by an intermediate Membrane at the beginning; but afterward that ceasing, this *Lamina* conjoins them at the Extremities, as they are at the Sides, before they appear without the Jaw. And thus I conceive these Teeth to be form'd, and 'tis by these I am perswaded the Jaw becomes so ponderous and thick; and that which strengthens this Opinion is, that the hind Teeth of both Jaws (for I doubt not but these *Rudimenta Dentium* are in the Upper Jaw also) before they come to grind, have their Upper Parts Semicircular; and that both before and after the Grinders are form'd, the Lineaments of these *Rudimenta* appear plainly like so many Ridges (d. e.) having intervening Furrows, where they formerly had been distinguish'd by Membranes: And I suppose tho' at the upper Extremity they are united into one compact Bone, yet at their lower Extremity they have still the same Hollownesses for Reception of the Ligaments and Vessels as formerly; which Opinion is confirm'd by *Tentzelius's* Account. The Lower Jaw has 4 Teeth, 2 on each side (d. e.) as well as the Upper, all Grinders, but no Incisors, or fore Teeth. The hind Teeth are 8 Inches distant, and the Fore not 4, betwixt which is plac'd the

Sinus

Tab. 3. Fig.
19.

Fig. 9.

Sinus for the Tongue (*d.e.*) and 'tis observable, that from thence to the bottom the *Sinus* is so contracted, as only to be one Inch broad (*f.*) The hind Tooth on the Right Side is 4 Inches, on the Left 5. The one half of their Surface, where they begin to appear, is Semicircular, with the fore-mention'd Ridges and *Sulci* running transversely, 4 on the Right Side, and 5 on the Left. The other half has 5 of those Eminences, where it Grinds, (whereof formerly, when speaking of the Upper Jaw,) and 4 on the Left. Each of the fore Teeth is 6 Inches long, and has 6 or 7 of the fore-mention'd Eminences, and as many Depressions. The hind Teeth of Dr. *Moulin's* Elephant seem to have been of an equal length on both sides, and much longer than the fore Teeth. 'Tis observable, that the Ridges at the sides are correspondent to the Eminences where they Grind, and the *Sulci* to the Depressions. The Teeth of the Lower Jaw exceed those of the Upper about 2 Inches in length; by which it appears, that the motion of the Lower Jaw must be very great in Mastication, and that the Elephant for the most part moveth the Jaw from behind to before; and scarcely from one side to the other, as in Animals that ruminate, or chew the Cud. These Teeth are the most firm, solid, and weighty Bones of any Animal yet known, and are as good Ivory as the Tusks themselves. Before we quit the Lower Jaw, I hope it will not be impertinent to enquire, whether or no these Rudimenta *Dentium* may be suppos'd in process of Time to descend and expell those Teeth already form'd, and succeed in their place; and if not, what may be their Use. For the first question, 'tis true, Children have two ranges of Teeth, tho' not equally solid, the second whereof expels the first at or about 7 Years of Age, and succeeds them, the first being only so many Sheaths or Covers, whereby the second, being yet but a soft Mucilaginous Substance, are defended from External Injuries, till in process of time they have attain'd to a convenient hardness; and that there is a great difference in the Teeth of some Quadrupeds, such as young Horses, whose Pole or Colt Teeth, as they are call'd, have some Marks, which are obliterated after a certain period of Years (well enough known to Jockies;) so that it would appear, if these Teeth are not expell'd, yet their Surface by degrees is abraded; and instead of that their Roots are augmented, and the Teeth receive such an alteration, as their Age is no more known by these Marks. I have already observ'd, that there are several Ridges and Furrows in the Teeth of this Animal, which seem to be an Evidence, that

The Teeth,
or Grinders
of the Lower
Jaw

that these *Rudimenta* have grown together and become one Tooth; but whether the *Rudimenta*, which have not as yet appeared without the Jaw, do ever expel these which have appeared, and succeed them, is the question; no Experiment yet being made concerning the Production of those in this Animal. The period of the Time that *Elephants* live, and the Age of this we treat of being unknown, we can give no positive determination in this Matter; yet I am apt to believe, these Teeth as well as the *Rudimenta*, have been a *prima formiore*, and that because, 1. The Jaw Bone so firmly adheres to the Teeth on both sides, so soon as they appear, and the place of their Roots is so well known (by the Protuberance on the outside of the Jaw) to be enlarg'd within the *Alveoli*, that I do not see how they can be expell'd by a succeeding Set. 2. When one Set of Teeth expels the other, the second is usually below the first, and not plac'd in the same Rank, as these are, which obliges me to enquire, what may be the use of these *Rudimenta*: Which I suppose to be, 1. To fill up the Cavity of the Lower Jaw. 2. By their Weight to add Strength in Mastication. 3. That there may be so many different Bones to assist the Teeth in their motion; and 4thly, To serve instead of a Wedge for keeping the Teeth firm in their Place. For the first, 'twas convenient the Lower Jaw should bear an equal proportion in its bigness to the Upper, and have sufficient space for Insertion of the Muscles fit for its Motion; and if a proportionable bigness, than either the Bone must be altogether solid or cavius, and stuff'd with some other ponderous Substance; for if spongy or cellulous, then would it have been too light, which would have been very inconvenient. As to the second, the Weight is of considerable Moment, for the more exact Attrition of the Aliment, which is here requisite, because the Tongue of this Animal is both small and polite in the Surface, without those sharp cartilaginous *Papilla* those Animals are endued with, whose Teeth are not sufficient to grind their Food. As to the third, I conceive that these *Rudimenta*, with their intermediate Membranes, may be the more helpful to the Teeth in their Motion, if they have any, or Pressure, than if the surrounding Jaw had been one whole continued solid Bone. For the fourth, a hard and soft Substance alternately plac'd, is certainly more convenient for keeping any thing firm than either of the two alone; for had they been hard Substances that lay upon one another, then neither would yield to Pressure; and if soft, tho' they yielded, yet would

not

they not so well retain the Pressure they receive, and keep any thing firm thereby, as if they had some intermediate Substance: In a word, be the use of these *Rudimenta* what it will, the Teeth and they together have rendered this so ponderous as to amount to 45 lb Weight. And thus have we ended the External Parts of the Head.

Being come to the Internal Parts of the Head, we shall proceed *Inner Parts* as in Treatises of *Osteology*, by taking Notice of its Structure, *of the Head.* two Tables, *Diploe*, Figure and Extent of the inner Table, *Fossa*, Eminences and *Foramina*; of all which in their order. As there is no Animal in proportion that is endued with a greater quantity of Brains than Man, so there is none that seems to have less than the *Elephant*. In the one, 'twas so order'd by the Wise Governor of all Things, that they might be sufficient for the Generation of so many Spirits, as are requisite for the Performance of the Rational and Animal Functions; and in the other, had the quantity of Brains been greater, the *Principia Nervorum* had been more divided; so that instead of being requisite, they had been vastly inconvenient, because the Nerves could not so well receive the Spirits dispers'd in a greater Mass, as now, when contracted within lesser bounds: And such a contrivance as this being requisite, the interposing of such a vast distance betwixt the two Tables of the Skull, as we shall come to give an Account of, is a stupendous Piece of Mechanism.

As we before observed, in the bottom of the Hole for the Root *Tab. 3. Fig. 1.* of the Trunk there are several *Lamina* (*b. b.*) to be seen. These *Lamina*, taking their Origin from hence, run backward in a Parallel, and sometimes oblique Line, to the second Table of the Skull, or that part of it which invests the Brain: And these *Lamina* being either horizontally, perpendicularly, or obliquely plac'd, meet with and intersect each other, forming intermediate *Cellules of the Head.* Cavities or *Cellules* (*c. c.*) of different Magnitudes, Positions and *Fig. 4.* Figures, according to the Intergerine Walls or Sides, whereof they are compos'd: So that although Dr. *Moulins*, and after him *Tenizelius*, seem to assert, that they were for the most part triangular, yet I have observ'd them quadrangular, pentagonal, hexagonal, and rectangular, and even sometimes irregular. These Cells run, as I said, from the outer Table, or External Parts of the Skull (*a. a.*) to the inner Table or Seat of the Brain (*b. b.*) and communicate with one another by pretty large Holes, either

K

toward

toward the inner or outer Table, and sometimes two meeting together in the middle frame a third. In a word, as there is no certain Rule observ'd in their Figure, so neither is there any in their Communication. The distance they fill up between the two Tables before is 11 Inches, at the Sides 8 Inches, toward the back-part but 3 Inches, and at the Hole for the Spinal Marrow (o.) both Tables meet together; for the Brain is plac'd in the lower and back-part of the Scull (Fig. 5.) All these *Cellules* were empty, and only obduc'd with a thin Membrane. And here I cannot but take Notice of what Dr. *Moulins* observes, namely, that there are several Blood Vessels pleasantly disseminated throughout the Surface of these *Cellules* with different Divariations; and *Tentzelius* says, he observ'd several Lineaments of Vessels after the same manner. This was not to be observ'd in ours at all, nor so much as the *Vestigium* of a Vessel to be seen; the reason whereof, I suppose to be this: When the one was burnt in *Ireland*, and the other over-whelm'd with Earth in *Germany*, both suffering violent Deaths, could not but have vast Struglings and Wrestlings, such as Dr. *Moulins* says his had, and such as *Tentzelius* supposes that in *Germany* to have had also. By these violent Motions, the Blood could not but be propell'd with a vast force from the greater Trunks to the smaller Capillaries, where it distended the Vessels, and rendred them so perceptible to the view after the Death of the Animal; whereas this we treat of, having labour'd of a languishing Distemper for sometime, as appears by the *Polypus's* found in the Heart and other Vessels, the Blood could not but be very languid, and scarce convey itself to these Capillaries; So that the Sides of the Vessels being collaps'd, they were rendred imperceptible: But that which is more remarkable is, that not so much as any of the *Sulci*, which these Vessels might have made in the *Lamina*, do at all appear; and yet the *Sulci* were still very evident in the Bones found in *Germany*, with the Blood Vessels containing the dry Blood strictly glued to them, and chang'd into a yellowish Colour, and that perhaps after thousands of Years, as the same Author observes. Indeed upon viewing more narrowly the *Cellules*, I find all of their *Lamina* endued with small Holes of an indefinite Number, and irregularly plac'd, through which these Vessels seem to have past from one *Cellule* to another: So that tho' not so observable, yet no doubt they have been dispers'd through them in this as well as in other *Elephants*.

We

We come next to enquire what may be the Use of the *Cellules*. Use of the
 There have been several Opinions advanc'd about them; as 1st. *Cellules*.
 That since the *Elephant* has been observ'd to suck up a great deal
 of Water by the *Proboscis*, that the Water perhaps is received
 into these *Cellules*, because of the Communication they seem to
 have with the *Proboscis*, and that thereby they cool their Brain
 in hot Countries, where they abound. 2. That since the *Elephant*
 has a very acute Sensation of Smelling, they think the *Nervus*
Olfactorius is dispers'd (after it has pass'd the *Os Ethmoides*)
 throughout the fine Membranes that obduce the *Lamina*,
 which describe these *Cellules*. 3. That these *Cellules* being in-
 terpos'd betwixt the two Tables of the Scull, they only serve to
 keep the Head from being too weighty. As to the first; admit
 the Water could be receiv'd into these *Cellules*, which from their
 Position at the Root of the Trunk, 'tis plain they cannot, there
 being no muscular Substance to expel these Waters, we cannot
 suppose this is their Use. As to the second; the *Nervus Olfacto-*
rius, after it has pass'd the *Ethmoides*, does not at all communi-
 cate with these *Lamina*, but penetrates the *Os Vomeris*, whence
 the cartilaginous *Septum* of the *Proboscis* arises: So that these *Cel-*
lules can be no ways assisting for that end; the Sensation of Smel-
 ling being chiefly perform'd in the *Proboscis*, and not by the Fi-
 bres of the *Nervus Olfactorius* dispers'd in these *Lamina*, which
 are quite otherwise dispos'd here, than in Men, Dogs, &c. whose
Lamina Spongiosa are situated in the Root of the Nose; so that
 the Air must touch them before it reach the *Os Cribrosum*; where-
 as here the *Lamina* are so situated, that the Air touches the *Ner-*
vus Olfactorius as soon as it can touch them. The third is to me
 more probable, and Dr. *Moulin* is of the same Thought, and
 that upon several Accounts; such as the Consideration of the
 small extent of the Seat of the Brain, to which had the rest of the
 Head been correspondent, it would have had no proportion to
 the Body; nor could the Muscles, fit for moving the Head, have
 sufficient space for their Insertion, nor the *Proboscis* for its Origin;
 so that there was a Necessity for interposing some distance be-
 twixt the inner and outer Table of the Scull. Now this distance
 must be fill'd up with some intermediate Substance, and had that
 either been carnous or osseous, whether spongy or solid, or
 (as some think the *Sinus Frontales*, *Maxillares* & *Basilares* in
 human Sculls are) Mucous; should either of these have occupy'd
 such vast bounds, the Head would have been rendered too
 K 2 weighty.

weighty. Therefore it is wisely order'd by Providence, that there shall be only thin *Lamina* of Bones, so dispers'd, that the outer Table of the Skull may be more strengthened for supporting the Weight of the Muscle of the Head, Lower Jaw, and *Proboscis* adhering thereto, that it may have a Communication with the inner Table, and that the space betwixt these *Lamina* may be empty; lest by any intermediate Substance, the Head had been too heavy, as is said, and the inner Table so burthen'd as to press too much upon the Brain, which might have disturbed the *Economia Animalis*. Analogous to this Structure we find in Oxen, which have the same *Cellules* betwixt the two Tables of their Skull, especially toward the Horns, whose Flints, as they are call'd with us, or the boney Substance, whereby that part of the Horn, which is toward the Head, is fill'd, is likewise cellulous, lest by their Weight, together with that of the Horns, they should prove uneasy to the Head: But lest by reason of these Vacuities, which are all plac'd in the upper and fore-part of the Head of the *Elephant*, (for the Brain and *Elevatores Capitis* are sufficient to depress its back-parts) it should be rendred so light, that it could not be equally pois'd or kept steady, the Teeth, both in the Upper and Lower Jaw, are rendred thus weighty to counterballance it.

Inner Sur-
face of the
Skull.

Tab. 3. Fig.
14.

We come next to consider the inner Surface of the Skull, where the Brain is lodg'd: 'tis in Figure like an Human one, but more Spherical, being from the Right to the Left 10 Inches, from before to behind 9 Inches, and from above to below at the *anterior Fossa* 7 Inches, betwixt the middle 5 Inches, and at the *posterior*, or Seat of the *Cerebellum*, 4 $\frac{1}{2}$ Inches. It has 4 *Fossa*, and 5 *Eminences*. The *anterior Fossa* (*b. b.*) is circumscrib'd by the fore-part of the inner Table of the Skull before, and by the two *anterior Eminences* (*c. c.*) behind. Here the Brain sends forth its greatest Production; for at the hind part this *anterior Fossa* is depress'd streight down near 2 Inches, where the *Os Ethmoides* begins, which is of a singular Figure and Structure; for from the fore-part of the Seat of the Brain in the middle, there is here, as in most Skulls, an Eminence which runs obliquely downward, till it begins to form the *Crista Galli* (*d.*) so call'd in Human Subjects. This *Crista Galli* divides the *Os Ethmoides* into its right and left Part; 'tis pretty thick and broad at the Base, whence it arises from each side, till it begins to form a *Crena*, which is perforated by 3 Pair of Holes; and then there arises

a small *Spina* in the middle (*d.*) at the fore Extremity whereof, it being further extended than the *Ethmoides*, there is another Hole. From this *Crista Galli* run on each side several prominent convex Lines, some obliquely forward, others obliquely backward, others transversely; each of which is branch'd out twice or thrice toward the Circumference, which 'twas impossible to express very lively in so small a Figure. These Lines have some few Perforations running from their highest part, but most of them are betwixt their Interstices, where they are pleasantly dispers'd after some kind of order, which also we could not express in the Figure. The *Os Ethmoides* is not unlike a Heart, as they usually represent it, being narrower at the hind part, where the *anterior Fossa* runs streight down from the fore-part of the *Sella Turcica* (*u.*) and broader at the fore-part of the Bone, which runs obliquely upward from it; 'tis from before to behind $3\frac{1}{2}$ Inches, and from the right to the left 4 Inches: Its Circumference is not altogether circular. The Speciality of this Structure gives ground to enquire into its Reason, and the acute Sensation of Smelling, wherewith, according to all Authors, this Animal is endued. In most of other Animals, neither is this *anterior* Production of the Brain so great, the Perforations of the *Os Cribrosum* so many, nor its extent so large: But in Animals of an acute Smelling, besides the Perforations of the *Os Cribrosum*, there are several spongy *Lamina* which arise from its lower part; each whereof are endued with Tunicles, wherein are variously dispers'd several Branches of the *Nervus Olfactorius*; and these *Lamina* are set very near to one another, as it were the Teeth in a Comb, or the *Lamella* in the lower Part of some Mushrooms. Both the Contrivance of the *Lamina* and their thick disposal, are very useful for Sensation; for whereas, had this *Nervus Olfactorius* been still in one Trunk, the Volatile Saline Particles would have only acted upon such Filaments as compose the Surface; whereas the Nerve being variously dispers'd into divers Branches, and these Branches differently dispos'd into several Surfaces, 'tis capable to receive Impression from as many Saline Particles, as there are different Branches and Surfaces, whereinto these are dispos'd: Add also, that the sharp Edges of these *Lamina* being toward the Air, they are more capable to divide the *Columna Aeris* suck'd in by the Nose, and give a greater tension to the Nervous Filaments dispers'd in them; whereby the Sensation is communicated the more lively to the *Sensorium Commune*;

and 'tis observable, that such Creatures as have most of these *Lamina* have their Smelling the more acute. Now this Structure is only to be seen in those Animals, whose *Septum intermedium* and two sides of the Nose consist of Bones, at least so far as their *Lamina* are extended; but it fares otherwise with our *Elephant*, whose *Os Ethmoides* is very thin, and has no *Lamina Spongiosa* adhering to its outside, nor a Bone for the *Septum*, or Sides to guard these *Lamina*, which would have been inconvenient, for then the *Proboscis* could not have mov'd with the same Facility, e'en from its Root, as it doth. Therefore to supply this defect, and still to continue the Smelling so acute, if not more in this than in many other Animals, 'tis provided, that the *anterior Fossa* should be very deep, that the Production of the Brain in it might be the greater; and lest its Surface should still be too small, there should be eminent Lines both in the *Vomer* and throughout the rest of the Bone, that there might still be more space for branching out the Nerve, as it proceeds from its Origin. There may also be another Reason alledg'd for these Protuberances, viz. because the Brain is more pendent here than elsewhere, they may serve as so many Columns to support it, lest by its Weight it should lean too much upon the *Os Cribrosum*, so that the Origin of the *Nervus Olfactorius* being too much press'd, instead of a clear, might afford a very confus'd Idea of Smelling; and, that even within the Scull it may be so divided and dispers'd in this Animal, as it useth to be without it in others: So that the defect of the *Lamina Spongiosa* without, is supply'd by this diversity of Perforations and Eminences in the *Os Cribrosum* within. Indeed in Horses there is somewhat of this Structure to be observ'd: The *Os Cribrosum* seems to be proportionally as large; its Perforations as frequent; and the *Lamina Spongiosa* without, both few and thin set; by which that Creature has but an ordinary Sensation of Smelling, and only such as is convenient for the choice of its Food; because the *Nervus Olfactorius* has not such a space wherein to be dispers'd, as the *Septum* and Cartilaginous Sides of the *Proboscis*; which is so great, that scarce can a Particle of any odoriferous Substance escape the touching of some one or other of the Nervous Filaments: Whereas in Horses, there being but a short space betwixt the *Os Cribrosum* and the Nose, the additional Surfaces of the *Lamina Spongiosa*, and the tension of the Bone of the Nose on both sides, otherwise than in the *Elephant*, who has no Bone there at all, are very convenient to supply that defect; for you know

know the more extended a Nerve is, the greater is its Sensation, and a Bone is fitter for tension than either a Cartilage or other soft Substances are. The *anterior Fossa* (*b. b.*) is from the Right Anterior to the Left 8 Inches, and from before to the *Nervus Opticus* behind 4 $\frac{1}{2}$ Inches, and of depth, *i. e.* streight down from the *Sella Scull*. *Turcica*, or in the middle betwixt the foresaid Holes to the bottom of the *Os Ethmoides* on each side, 2 $\frac{1}{2}$ Inches. The two middle *Fossa* are bounded before by the two *anterior Eminences* (*e. e.*) and behind by the two *Processus Petrofi* (*s. s.*) The Seat of the Brain is here 12 Inches Diameter (*r. r.*) In the Center between the two *anterior Processus* is the first Pair of Holes (*f. f.*) at an Inch distance. These run obliquely between two small Eminences, where the *Glandula Pituitaria* was lodg'd, call'd the *Sella Turcica* (*u.*) and these two *Processus* are call'd in Human Subjects *Clinoides*. This Pair of Nerves runs obliquely downward 6 Inches, and passes out below the *Lamina* on each side of the Head (*s.*) which frames the upper Edge of the *Sinus* for the Globe of the Eye, being the second Pair, call'd the *Optick Nerves*. These two *Processus* running $\frac{1}{2}$ Inch back on each side, at the same distance afford two more Holes passing in below them, which could not be shewn in the Figure; this is call'd the *Foramen lacerum*, and through it pass the third Pair, or *Oculorum Motorij*; the 4th Pair, or *Patetici*; the *Ophthalmic*, or first Branch of the 5th Pair, and all the sixth Pair (*g. g.*) The third Pair of Holes is at the back of the two *anterior Eminences*, betwixt the first Pair and the External Part of the Seat of the Brain, 4 Inches distant from each other (*h. h.*) They are the largest of all those in the bottom of the Scull, except that for the Spinal Marrow, and have a peculiar Use, which is at large declared, Pages 82 and 83, when speaking of the Vessels and Nerves of the *Proboscis*; viz that they are for the transmission of the *superior Branch* of the second Division of the 5th Pair of Nerves, and a Branch of an Artery which proceeds from the *Arteria dura Matris* (*k. k.*) being separated from it by the boney *Septum*, which passes betwixt it and the Hole for the third Branch of the 5th Pair (*i. i.*) runs along the *Crena* (*x. x.*) and passes out with the foresaid second Branch (*g. g.*) The fourth Pair of Holes then is for the Egress of the third Branch of the 5th Pair (*i. i.*) and Ingress of a Branch from the *Arteria dura Matris*; and the 5th Pair is for the *Arteria dura Matris* itself. The sixth Pair is for the Carotid Artery (*l. l.*) which is otherwise situated here than in Human Subjects; for in them it

Fossa of the Scull.

Middle Fossa.

First Pair of Holes.

Fig. 2.

Second Pair.

Fig. 14.

Third Pair.

Fourth Pair.

Fifth Pair.

Sixth Pair.

is.

is betwixt the *Processus Petrosus*, and two posterior *Processus Clinoides*; whereas here 'tis betwixt the *Processus Petrosus* and Center of the Base of the Skull, on each side about 3 Inches distant from each other. The seventh Pair is for the *Nervus Auditorius* (*m. m.*) being situated in the *Processus Petrosus* (*S. S.*) And here 'tis observable, that from the side of the Hole where the Carotid Artery (*l. l.*) passes toward the *Os Petrosus*, there is an Hole which runs about $1\frac{1}{2}$ Inch outward, forms an Angle, and then passing by the Sides of the *Cavitas Tympani* (*e.*) runs streight downward and penetrates the Skull (*l.*) This I take to be the Hole for the hard Portion of the *Nervus Auditorius*, which does not here as in other Animals, pass in at the Hole of the *Processus Petrosus* with the soft Portion; but as it proceeds from the Brain, goes along the Sides of the Carotid Artery to this Hole. This hard Portion, as I told you, was much bigger as we trac'd it running forward above the Temporal Muscle, and going to the upper Lip to be afterward dispers'd in the *Proboscis*. The eight Pair is for the Internal Jugular Vein, and *par vagum*, which passes out at the same Hole (*n. n.*) And the Ninth *Impar*, is for the Spinal Marrow; of which already. And thus we have given an Account of all the Parts of the inner Surface of the Skull. Now we come to the Consideration of

The Ear, whose Parts are, 1st. The *Meatus Auditorius*, or that *Duct* which runs from an Orifice on each side of the Head (*k.*) whereof formerly, to the inner Table of the Skull, terminating in the *Os Petrosus* (*S.*) being of a Cylindrical Figure (*b. b.*) having the *Cellules* arising from it on all sides (*c. c. &c.*) 'Tis in length from the External Orifice to the *Crena* for the *Membrana Tympani* (*b.*) $9\frac{1}{2}$ Inches, and about 1 Inch Diameter throughout the whole Extent. Its Sides are compos'd of a firm solid Bone, and little thicker than an Halfpenny. Next is observable the *Crena* for the *Membrana Tympani*, in Circumference 2 Inches $\frac{1}{2}$: After which is to be seen the *Cavitas Tympani*, consisting of two Parts; the first whereof (*c. c.*) is $\frac{1}{2}$ Inch deep, streight down from the foresaid *Crena*, endued with a great many *Cellules*, distinguish'd from each other by several osseous solid *Lamina*, irregularly dispos'd, which could not be so well represented in the Figure. These Excavations were about two or three Lines, or $\frac{1}{2}$, or $\frac{1}{4}$ Inch deep. The next Cavity (*d.*) is of a Surface more smooth, arises much higher than the former, and runs toward the outer Table, having several Semicircular Lines running across.

Tab 3. Fig.

2.

Fig. 13.

Fig. 12.

Fig. 10.

A Hole for
the Spinal
Marrow.

across. The first Cavity is from the Right to the Left $1\frac{1}{2}$ Inch, and from before to behind $1\frac{1}{4}$ Inch. The second Cavity 1 Inch in length, and $\frac{1}{2}$ Inch at its broadest part. The *Officles*, viz. the *Malleolus* (a.) *Incus* (b.) *Stapes* (f.) are of a proportional bigness, as you see in the Figure, where they are shewn in their true Dimensions, running from the *Malleolus*, which touches the *Membrana Tympani*, to the *Basis* of the *Stapes*, which shuts the *Foramen Ovale* (c.) It has but a small *Cochlea* in proportion (d.) whereinto a Branch of the Soft Portion enters, and another Branch of the said Portion goes into the *Cavitas Tympani*, whose upper part is covered by the lower side of the *Os Petrosum* (b.b.) I was at some Pains to file down a great part of the *Os Petrosum*, where I observ'd how the Hard Portion pass outward from the Hole for the Carotid Artery, as is said, and how the Soft Portion after it had entred the *Processus Petrosus* (e.) did divide itself into these two just now mention'd Portions, to the *Cochlea*, and *Cavitas Tympani*. I search'd for the *Labyrinth*, or *Linea Semilunares*, but could find none; by which I concluded, that these Caverns in the bottom of the *Cavitas Tympani* did serve for the same Uses in this Animal, as the *Meanders* of the *Labyrinth* do in others; and that this second Cavity did serve for receiving and continuing the Undulations of the Air, for the longer retaining of the Sound, as we see the cavous *Apophysis Mastoidea* does in Sheep, Cats, Dogs, &c. and the Spongy one in Men. The *Foramen Ovale* is but little, and the *Base* of the *Stapes* very thin and slender (h.) whereby I suppose the Sensation of Hearing is rather perform'd by the Vibrations of the Air upon the *Cavitas Tympani*, than by any assistance it had from the *Cochlea*. The upper part of the *Septa* which circumscrib'd the Caverns in the *Cavitas Tympani*, is thicker, and the lower part very slender; and I doubt not but they communicate with one another by several *hiatus*, whereby what humidity is in the bottom of the Caverns may be convey'd from each other, till it come to the Orifice of the *Aqueduct* parallel to it, and thereby discharge it into the Mouth; for the boney part of this *Aqueduct* descends in a streight Line, from the fore part of the bottom of this *Cavitas Tympani* $5\frac{1}{2}$ Inches flat, being from the Right to the Left about $\frac{1}{2}$ Inch, and from before to behind 3 Lines, or $\frac{1}{8}$ of an Inch. I am sorry I did not know the *Os Petrosum* would so easily separate for I might have observ'd more narrowly the Structure of the Ear before the Scull was boild; and 'tis by an accidental Separation of this

L

Bone,

Bone, after the Head was taken out of the Caldron, that I have now come to give this Account of it.

From the Head we go to the Trunk, which consists of the Spine, Ribs, and Sternum. The Spine is divided into the *Vertebra* of the Neck, Back, Loins, *Os Sacrum*, and Tail. The *Vertebra* of the Neck differing from each other in several things material, I shall speak of them separately: Whereof

The first
Vertebra of
the Neck.
Tab. 4. Fig.
1.

A.

A. 1.

The second.
A. 2.

The first call'd *Atlas*, has four considerable Cavities; two at the fore part (*b. b.*) whereby it receives the *Condyles* of the Scull, and two at the back-part (*c. c.*) whereby it receives the Base of the following *Vertebra*; the first two are $2\frac{1}{2}$ Inches from above to below, and 2 Inches from the Right to the Left. It has a large Hole in the middle, divided into its larger part (*a.*) 3 Inches Diameter, which is for receiving the Spinal Marrow, and Lesser, which receives the Tooth of the following (*b.*) Four Perforations, or two Pair of Holes at the Sides; one at its lower and fore-part (*c. c.*) which receives the *Arteria Cervicalis*, or *Vertebral* from the side of the Spinal Marrow, and conveys it to a *Crena* (*e. e.*) along which it runs, till it again penetrates the same Bone (*d. d.*) and goes out at the back part; after which in its Progress it perforates all the transverse Processes of the rest of the *Vertebra* of the Neck, as is usual in other Animals. This *Crena* is guarded on its outside, or at the Extremity of the transverse Processes by a Protuberance, which runs toward the Scull $1\frac{1}{2}$ Inch (*a. a.*) till it be equal to the Sides of the Hole for the Spinal Marrow. At its upper and fore-part it inclines obliquely (*f.*) where 'tis 3 Inches thick, and at its lower and back-part (*e.*) it has a Protuberance which is extended where it embraces the Tooth. This *Vertebra* is in Diameter 12 Inches (*a. a.*) The transverse Processes are in breadth from above to below 2 Inches, and in length at their lower part 3 Inches.

The second *Vertebra* has remarkable in it, 1st A large Protuberance called the Tooth (*d.*) which is received by an Hole in the former, and serves as an Axis upon which the Head is turn'd round. This Tooth runs forward from the Body of the *Vertebra* 2 Inches above, and $2\frac{1}{2}$ Inches below, tapering and terminating in an obtuse Point. 2. A large Protuberance arising from its upper and middle part (*a. a.*) (like the *Processus Spinosus* in others, 4 Inches from the beginning of the transverse Processes, two Inches broad at the top, terminating in two obtuse Points, with a *Sinus* (*b.*) larger at the back than the fore-part) in the middle.

1 his

This Protuberance inclines forward toward the first *Vertebra*.
 3. Its Body or back-part, and Base of the Tooth (*f.*) transv. B. 2.
 versely $4\frac{1}{2}$ Inches, perpendicularly 4 Inches. 4. Two oblique
 Processes, by which 'tis articulated with those of the following,
 and betwixt which there are 4 Inches (*b. b.*) 5. Two transverse
 Processes (*g. g.*) each 2 Inches long. At its fore-part on each
 side of the Tooth (*d.*) are two Protuberances (*e. e.*) which are
 received by the two hind Cavities of the first *Vertebra*. This *Ver-* A. 2.
tebra is two Inches thick from before to behind, the Hole for the
 Spinal Marrow 2 Inches Diameter, those for the Cervical Artery
 (*f. f.*) $\frac{1}{2}$ Inch Diameter. Between the oblique and extremity of
 the transverse Processes, 'tis 6 Inches.

The third and fourth *Vertebra* differ from this, 1st. In their *The third*
 four oblique Processes (*e. e.*) viz. two by which they are articu. and fourth
 lated with the preceding, and two with the following, which *Vertebrae*.
 is common to those of the Neck, Back and Loins. 2. In their A. 3. A. 4.
 Convex Body before (*b. b.*) and concave behind (*c. c.*) where they
 are receiv'd by, and do receive the preceding and following,
 which is also common to the other *Vertebra*. 3. In their Eminences
 at the Top (betwixt the oblique Processes) at $4\frac{1}{2}$ Inches dis-
 tance (*e. e.*) betwixt which there is a Depression in the third,
 and a small Protuberance in the midst of this Depression in the
 fourth. Their transverse Processes (*f. f.*) are 2 Inches broad at
 the Extremity, from which they descend obliquely 3 Inches, having
 a Protuberance on each side, betwixt which and the Body of the
 preceding *Vertebra* (*b. b.*) does proceed a Branch of the Cervical
 Artery, which it continues to do from betwixt all the other *Ver-* Fig. 3.
tebra of the Neck, till it comes to betwixt the Seventh of the
 Neck and first of the Back, where 'tis wholly spent. Betwixt
 the oblique Processes (*e. e.*) and transverse (*f. f.*) it is 4 Inches.
 The Hole for the Cervical Artery (*d. d.*) is here Oval. The
 Bodies of these *Vertebra* are thinner below than the former :
 They are 4 Inches in Diameter, being of the same Dimensions
 with all the other *Vertebra* of the *Spine*, till you come to the *Os*
Sacrum. Those in the Neck are more flat before, and those in
 the Back more Protuberant. Besides those *Sinus's* in the inside
 of the fore-mention'd Protuberances in the Neck, there is like-
 wise a *Sinus* betwixt the transverse Processes of each *Vertebra* and
 its Body, throughout the whole *Spine*, for transmission of the
 several Conjugations of Nerves from the Spinal Marrow.

The fifth.
A. 5.

The fifth *Vertebra* is of the same Dimensions with the other two, and differs in nothing from them but by its Spinal Process, which from $\frac{1}{2}$ Inch in the former arises to $1\frac{1}{2}$ in this, being $\frac{1}{2}$ Inch broad, and thin at the Extremity.

The sixth.
A. 6.

The sixth *Vertebra* differs from all the rest in its transverse Process, which is as far forward as the rest, and sends out another Process, which runs a backward; so that from the Extremity at the fore-part to that at the back-part, 'tis 3 Inches. It also sends another Protuberance obliquely outward $1\frac{1}{2}$ Inch (*i. i.*) At this Process the Cervical Artery passes out from the transverse Process of the *Vertebra*, and only sends a Twig to the

Fig. 3.

The seventh.

Seventh *Vertebra*, or last of the Neck, which differs from all the rest, 1st. In the length of its Spinal Process, which is augmented from 3 Inches in the former to 5 in this (*g. g.*) 2. In the smallness of the Hole for the Cervical Artery (*d. d.*) this being the last perforated transverse Process, as is said. 3. In a *Sinus* on each side of its Body behind (*i. i.*) whereinto it receives part of the first Rib.

The Thorax.

The *Thorax* is divided into the *Vertebra*, Ribs, and *Sternum*: There are 19 *Vertebra*, correspondent to so many Pair of Ribs; they differ nothing from the former, except that their Body is more Protuberant, that their Spinal Processes are augmented and diminished in their length, according to their Situation, and that they have a *Sinus* in each side, both before and behind, for Reception of their respective Ribs: For the Weight and Dimensions of their Spinal Processes see the following Table.

Ribs.

The Ribs are divided into the true (which are articulated with the *Sternum*) and false ones, with, and without Cartilages. There are 8 Pair of true Ribs, 8 Pair false with, and 3 without Cartilages. The Cartilages here are soft, as in Human subjects, and not boney, as in Oxen, Harts, &c. The length of the Ribs both from the one Extremity to the other, and along their inner Surface, that you may the better know how much they are bended, with their breadth at the Extremity and Weight of each Pair, shall be given in the following Table.

Sternum.

The *Sternum* consists of four Bones; they are plac'd edgewise, being two Inches thick above, and sharp below: From the fore-part to the Point of the *Cartilago Ensisformis* 'tis 25 Inches; whereof the first is 88 Inches long, and $4\frac{1}{2}$ Inches broad at the Articulation of the first Rib; the second $4\frac{1}{2}$ Inches long, and 3 Inches broad; the third $3\frac{1}{2}$ Inches long, and 3 Inches broad; the 4th

4 Inches long, and $2\frac{1}{2}$ Inches broad; the rest of the length is made out by the *Cartilago Ensiformis*.

The *Loins* consist of three *Vertebrae*, whose Spinal Processes are but short; their transverse Processes a little longer than those in the Back; which beside their Weight, (for which see the Table) is all that is material about them. The Vertebrae of the Loins.

The *Os Sacrum* consists of five Bones; they are of a flat Surface before (B) each having three Processes (*viz.* two oblique, and one Spinal, under which the Spinal Marrow descends) behind. They are perforated before by 4 Pair of Holes, plac'd at their Interstices on each side. It is 12 Inches long and $7\frac{1}{2}$ broad, where 'tis articulated with the *Ossa innominata* above, and 6 Inches broad at the lower part. See Fig. 4 and 5. The Os Sacrum. Tab. 4 Fig.

The *Tail* consists of twenty nine *Vertebrae*, whose differences are to be seen in the following Tables. From the *Os Sacrum* to the Eighth they have five Processes, *viz.* two transverse, two oblique, and one Spinal, under which the Spinal Marrow descends, sending forth a Conjugation of Nerves from betwixt each of them. From the Eighth to the Sixteenth each has 4 Processes, *viz.* two longitudinal behind, betwixt which the remainder of the Spinal Marrow still descends, and two transverse: The rest have no Process at all, but are of a kind of quadrangular Figure, having a Ridge which descends before and behind, and on each side; being somewhat bigger at each end, and smaller at the middle. All the *Vertebrae*, as well in the Neck and Back, as Tail, had Cartilages, which run betwixt each of them; they were about $\frac{1}{2}$ Inch thick in the Back, thinner in the Neck, and thicker proportionably in the Tail. These Cartilages I was obliged to supply with Leather in mounting the Skeleton, as shall be shewn. So much for the Trunk. The Vertebrae of the Tail.

Because this is a Quadruped, we shall divide the Extremities into the fore and hind ones. We begin the fore Extremities at the *Scapula*, which is usually divided into its Head, Neck, *Spine*, Processes, fore and hind Cavities, (*i.e.* these Parts before and behind the *Spine*) its concave part, which lies upon the Ribs, and its convex or outer part, and its Margin. The Head (*a.*) which receives the *Os humeri*, is oblong, (because the motion of the *Humerus* perform'd by this Animal, is rather Flexion and Extension, than Adduction or Abduction) wherefore the Cavity being $5\frac{1}{2}$ Inches long, is only $3\frac{1}{2}$ Inches broad, and the Margin of the Bone arising from the fore and back-part (*b. b.*) makes it The Fore Extremities. Scapula.

2 Inches deep; for at the sides the Margin is equal to the Cavity. At the back-part there are two Processes; that which regards its convex part is 2 Inches long, rugous, thick and obtuse; that which regards the concave, runs two Inches backward, where it forms an obtuse Angle; whence it ascends 3 Inches to the Neck: This has a sharper Edge than the former, being somewhat incurvated. Betwixt these two Processes is a rugous *Sinus* two Inches broad, ascending from the Cavity of the Head 3 Inches to the Neck, and rising somewhat in the middle of its Progress. The Neck (*c. c.*) is flat, being more obtuse at its back-part, and where is the last nam'd Protuberance, and sharper at its fore, where is a little Protuberance toward the *Spina* on the convex side, being more plain on the concave. Betwixt the first of the fore nam'd Protuberances (*b.*) and the *Spina*, there is a *Sinus* which ascends 4 Inches (*d.*) and from the same Protuberance (*b.*) to the Extremity of the *Processus Coracoideus* (*e.*) is $3\frac{1}{2}$ Inches. This *Processus Coracoideus* is that part of the *Spina* (*e.*) which runs toward the Neck of the *Scapula*, but does not, as in Men, defend the *Humerus* from Dislocation. 'Tis very rugous and convex before, but concave at its back part, being $3\frac{1}{2}$ Inches broad at the Point it ascends 11 Inches, where 'tis raised 5 Inches from the Body of the *Scapula* (*f.*) it inclines a little backwards and ascends 12 Inches more, till it be lost where the *Epiphysis* begins (*g.*) being still concave at the fore, and convex at the back-part. From the *Spina* (*f.*) it sends forward a Production 8 Inches long (*h.*) 3 Inches broad at its upper part, two Inches about the middle where 'tis crooked, and $1\frac{1}{2}$ Inch at its lower Extremity where 'tis thin and sharp; but at its upper part thicker and rugous, concave at the inner, and convex at the outer side. This Process serves to keep the *Musculi supra-spinati* within their bounds, when they pull up such a vast Weight as the fore Leg. As the *Spina* runs up 5 Inches from this Production, 'tis rugous and thick in its edge, from thence it becomes gradually thinner till it comes to the *Epiphysis*. The Back and upper part of the *Scapula* is very thin, and sharp from the Neck (*c.*) 16 Inches upward to (*m.*) from thence it ascends 5 Inches to the place where the *Spina* ends, and forms a very rugous and spongy *Epiphysis*, thick at the upper end (*l.*) thence it descends obliquely two Foot (*i.*) whence its fore edge runs obliquely in toward the Neck 10 Inches, being sharp; thence it tends outwards and descends other 5 Inches till it comes to the Neck. All the upper part of the

Scapula

Scapula from (m) to (l) where 'tis thickest, and from (l.) to (i.) where 'tis thinner, except towards its lower part, is covered with an *Epiphysis* (as is said) spongy and rugous, which separated by the boiling, and is a further Argument that this Animal was Young, according to their term of Life; 'tis otherwise a very thin Bone and solid, except where the *Epiphyses* are.

The *Humerus* is a very irregular Bone; its Head is in Circumference 2 Foot, having 2 remarkable *Epiphyses*, one whereby 'tis articulated with the *Scapula* from before to behind with a convex Surface 8 Inches, and from the right to the left $4\frac{1}{2}$ Inches, and another on the outside rising higher and sharp about $1\frac{1}{2}$ Inches. Round this *Epiphysis* is 11 Inches, and from before to behind with a flat outside $6\frac{1}{2}$ Inches. Betwixt the *Epiphyses*, which receives the *Scapula*, and this Protuberance is a *Sinus* about $3\frac{1}{2}$ Inches broad, and about $1\frac{1}{2}$ Inches deep; as it descends toward the inside it becomes deeper, and only 2 Inches broad: 'Tis for lodging the external Tendon of the *Biceps*, analogous to a *Crena* for the same purpose in human Subjects. The Neck of the *Humerus* is in Circumference 19 Inches, flat behind for the space of 4 Inches, then forming an Angle, and running obliquely outward 3 Inches, then passing forward below the utmost Protuberance 5 Inches, thence crossing the forenam'd *Sinus* it runs back, first flat, then a little convex, 7 Inches. Below this outward Protuberance there is a rugosity for the Insertion of the *Plexores Cubiti*; $6\frac{1}{2}$ Inches long, and $3\frac{1}{2}$ Inches broad at the upper part, and thence descending gradually it terminats in a Point. At the lower part of this rugosity the Bone is $13\frac{1}{2}$ Inches in Circumference, having 3 Faces; one at its Back part 5 Inches broad, somewhat depress'd from the inside, then a little Protuberant, as it tends outward; a second on the outside, and 4 Inches broad; and the third on the inside, $4\frac{1}{2}$ Inches broad, flat also. Here begins another considerable rugosity, small and oblique from the back part of the utmost Protuberance of the *Humerus*, and becoming very rugous at this Place, continuing 6 Inches obliquely downward, and 2 Inches broad about the middle. At the lower part of this rugosity the Bone is 18 Inches in Circumference, with its three Faces otherwise disposed; that which was before terminated in an obtuse *Spina*, and where it was an obtuse *Spina* behind, now becoming flat. On the outside begins a considerable *Sinus*, being the Continuation of the *Sinus* formerly mention'd betwixt the *Epiphyses Humeri*, and outer

Protuberance, whence in its descent the Bone became depress'd; and now the *Sinus* is conspicuous (3) being fram'd by an obtuse *Spina*, descending obliquely forward from the foresaid rugosity on the one side, and another obtuse *Spina* descending obliquely outward on the other. This *Sinus* (3) is $4\frac{1}{2}$ Inches broad from before to behind; thence measuring backward the Bone is flat $3\frac{1}{2}$ Inches; measuring from thence on the inside, the Bone having form'd an obtuse Angle, is $5\frac{1}{2}$ Inches flat also. The *Spina* on the fore side, after it has descended $5\frac{1}{2}$ Inches, the Bone becomes flat; that on the outside terminating in a considerable Protuberance, $4\frac{1}{2}$ Inches long, where the Bone has only two Faces, convex before and concave behind, and 17 Inches round. Behind its foresaid outward Protuberance is 7 Inches; it becomes $1\frac{1}{2}$ Inches depress'd in the middle, where the *Sinus* for receiving the *Cubitus* begins. From the foresaid external Protuberance it descends in a straight Line 8 Inches, and from its opposite part at the inside it descends obliquely backwards 5 Inches; and here the lower *Epiphysis* begins, where 'tis receiv'd by the *Cubitus* and *Radius*. This *Epiphysis* is 1 Foot $10\frac{1}{2}$ Inches round, being 3 Inches thick at the outside and flat, and 7 Inches at the inside and Protuberant; betwixt which behind is a considerable *Sinus* $5\frac{1}{2}$ Inches broad, and $2\frac{1}{2}$ Inches deep, and before, another *Sinus* 7 Inches broad, of the same deepness. This *Epiphysis* is at its lower extremity and inside, where it receives the *Cubitus*, $5\frac{1}{2}$ Inches from before to behind; of a convex Surface, and 6 Inches at its outside, where 'tis receiv'd by the *Radius*. At its fore part the *Sinus* is not very considerable, but at its back part deeper and narrower for receiving the *Olecranon*. At the extremity of the *Epiphysis*, 'tis narrower, being only 6 Inches from the right to the left before, and $7\frac{1}{2}$ Inches behind. And thus you have an Account of the most irregular Bone of the Body, being at its external part 30 Inches in length, and 26 at its internal; having a large Head consisting of an *Epiphysis* receiv'd by the *Scapula*, a large Protuberance on the outside defending it from Dislocation, and a *Sinus* betwixt the two reaching a good way back, thence descending to its Neck, whence the Bone becomes flat (2) to about the middle, descending on the outside, flat also, with two rugosities for the Insertion of the Tendons. Betwixt this outside and back part, is a very large *Sinus* for the *Biceps*, which oblique situation (3) is an admirable contrivance for adding Strength and conciliating length to this Muscle. Now the shape of the Bone begins to be chang'd,

chang'd, for whereas it formerly reach'd from before to behind, now it reaches from the right to the left, and its lower extremity (4) becomes broader, whereas at its upper extremity it was rounder.

The *Cubitus* and *Radius* are two Bones of a singular Figure, the one lying above the other: We shall begin with the *Cubitus*, which is in length from the top of the *Olecranon* to its Articulation with the Bones of the *Carpus* (5) 28 Inches. The *Olecranon* (1) from the right to the left, with a Surface somewhat convex, is $9\frac{1}{2}$ Inches; and from before, where it is articulated with the *Humerus*, to its utmost point behind, in a straight line 7 Inches. This *Olecranon* as it descends, becomes narrower by degrees, till it forms a *Spine*, which runs obliquely forward 13 Inches, where 'tis contracted from the fore-said $9\frac{1}{2}$ Inches to 3 in breadth. Afterwards the Bone is enlarg'd on each side, till it forms a convex Surface, which is received by, and articulated with the *Humerus*. This Articulation is a *Ginglymus*, as in all other Animals; viz. the *Cubitus* and *Radius* together receive the *Humerus* on the outside before, which on the inside the *Cubitus* doth alone. Berwixt these two is a large Protuberance rising 2 Inches, which is also received by the *Humerus*. Measuring from the extremity of the *Cubitus* and *Radius*, which receive the *Humerus*, on the outside to its opposite part on the inside, including the back part of the *Olecranon*, it is 10 Inches. Both the Bones from the right to the left, at the articulation before, are 7 Inches. Then measuring round the *Cubitus*, below the Articulation, is $16\frac{1}{2}$ Inches. Here the Bone is flat before, from the right to the left 7 Inches; from thence obliquely backward to the forementioned *Spine* beneath the *Olecranon* is 5 Inches on the outside, and $6\frac{1}{2}$ on the inside. At the lower part of the fore-said *Spine* the *Cubitus* is in Circumference 11 Inches; viz. flat before 4 Inches, where it forms an Angle; thence running obliquely backward 2 Inches, forming another Angle; thence $1\frac{1}{2}$ Inch obliquely backward, where 'tis a little Protuberant; and from thence obliquely inward $3\frac{1}{2}$ Inches. Round the lower extremity of the *Cubitus*, and 3 Inches above the *Epiphysis*, it is 12 Inches; viz. from the *Radius* $2\frac{1}{2}$ Inches; thence obliquely outward, with another flat Surface, $3\frac{1}{2}$ Inches; and from thence, with a convex Surface, round the back part 6 Inches. The *Cubitus* at the *Epiphysis*, from the *Radius* on the fore part to its opposite side on the back part, is 3 Inches; from the upper part of the lower *Epiphysis*, where 'tis articulated with the external Bone of the *Carpus*, obliquely in-

ward is 5 Inches. This same *Epiphysis*, with a convex Surface behind, from the right to the left is 5 Inches.

Radius.

The *Radius* in length, from the external and upper part of the *Cubitus*, on which it lies, and with which it is united, running obliquely inward, is 1 Foot 9 $\frac{1}{2}$ Inches. At its upper part it sends a Production outward 3 $\frac{1}{2}$ Inches, by which, with a part of the *Cubitus*, it receives the external part of the lower *Epiphysis* of the *Humerus*: From thence the Bone is contracted at its fore part to 2 $\frac{1}{2}$ Inches; then descending 10 $\frac{1}{2}$ Inches, it becomes 2 $\frac{3}{4}$ Inches broad; thence it enlarges gradually till you come to the lower *Epiphysis*, where measuring from the fore part of the *Cubitus* to its opposite and back part, the *Radius* is 8 $\frac{1}{2}$ Inches; thence you descend 3 Inches, to its articulation with the internal Bone of the first rank of the *Carpus*. This Bone is quadrangular above, descending to about the middle it becomes more convex; from thence it is gradually enlarged, and during the whole Progress pretty free from the *Cubitus*, except where 'tis conjoin'd with it at its upper part: At the lower articulation, the one is only separated from the other by a Cartilage. The lower *Epiphysis* of these Bones is of a very unequal surface, and though not separated from them by boiling, yet plainly distinguish'd by their Cartilages, which are not yet Ossified.

The Fore Foot (as the Hand in human Subjects) consist of the *Carpus*, *Metacarpus*, and Fingers, or rather Toes. The *Carpus* has 6 Bones dispos'd into 2 Ranges, differing in Figure from each other, rugous before, endu'd with several Holes for transmission of Blood Vessels, and of a convex Surface behind, having several inequalities for Insertion of Tendons.

External Bone of the first Rank.
Tab. 4. Fig. 8.

The External Bone of the first Rank (1) is an irregular Bone, running forward with a convex Surface, till it meets with its Copartner, 5 $\frac{1}{2}$ Inches; passing in a more direct line 3 $\frac{1}{2}$ Inches behind. It has 3 Faces: Its upper View, in the Figure, whereby it is articulated with the *Cubitus*, from behind to before is 2 $\frac{1}{2}$ Inches, from the right to the left 3 $\frac{1}{2}$ Inches. At the fore part it has a Prominence which is receiv'd by the *Cubitus*, from which the Bone declines as it runs backward, and forms a depression about the middle, rising higher at the hind part. At each side, on the right and left, it receives the *Cubitus* by two Superficial Sinus's. Its Second Face, whereby it is receiv'd by the second Bone of this Rank, runs from before to behind 2 $\frac{1}{2}$ Inches. It is very narrow, and only touches its Copartner of the lower part; for betwixt this

this and the other is a small Cavity, whose Surface compos'd by both Bones is unequal for the Insertion of Tendons, and perforated with several Holes for immision and egress of Blood Vessels: Its lower Surface is articulated with the outer Bone of the second Rank by a *Ginglymus*; i. e. behind it has a *Sinus* for receiving that below it. About the middle it has a small Prominence which is receiv'd by the other, and both are conjoin'd by a plain Surface behind. From before to behind it is 3 Inches, and from the right to the left 4 Inches, being $1\frac{1}{2}$ thick. It has three Protuberances; one larger at its outside, more obtuse; one lesser below that more sharp, extended a little further to cover a part of the outer Bone of the second Rank; and a third on its inside towards its Co-partner: Besides these, it has another small Face at its upper and back part, which runs 2 Inches from the right to the left, and $\frac{1}{2}$ Inch from above to below, being also conjoin'd obliquely with the back part of the *Carpus*. This Bone weighs 6 $\frac{3}{4}$.

The second Bone of the first Rank (2) is of the same thickness with the former, being articulated with the *Radius*; it is 3 Inches from the right to the left before. At its middle it has a *Sinus* on each side; one towards the former, making up with it the forenam'd Cavity, the other on its opposite side, where it receives the third Bone of this Rank; so that here 'tis only 2 Inches Diameter, and further back but $1\frac{1}{2}$ Inch: From behind to before it is 3 Inches, and behind 'tis articulated with the *Radius* by a *Ginglymus* also, for before 'tis received by a small Production of the *Radius*; about the middle it receives the *Radius*. This Bone weighs 5 $\frac{3}{4}$. The Second

The third Bone of this Rank (3) is only articulated with the former at the side, where 'tis receiv'd into the forenam'd *Sinus*, above which it is also receiv'd by the *Radius*. It runs $1\frac{1}{2}$ Inch higher than the former, and as much lower; so that it is $4\frac{1}{2}$ Inches from above to below, making up almost the whole inside of the *Carpus*. It terminates above in an obtuse point, from thence it becomes still broader, so that 'tis 2 Inches from above to below. At its lower part it rests upon the second and third Bone of the second Rank: It weighs 3 $\frac{3}{4}$. The Third

The first Bone of the second Rank (1) in its fore and outer side follows the same Progress with that above, being 6 Inches from behind to before, where 'tis conjoin'd with its Partner; and from before, at the Articulation with its Partner, to behind 4 Inches; from the right to the left behind, where it is broadest, 3 Inches. The first Bone of the second Rank.

Its Surface behind is unequal for the reception of Tendons. It is articulated above with the first Bone of the first Rank, and with 3 Bones of the *Metacarpus* below, and at its inside with its Partner of the same Rank. Its articulation above is *per Ginglymum*, as is said; i. e. before and behind 'tis receiv'd by that above, and at the middle it receives it: It is $2\frac{1}{2}$ Inches thick before. It weighs $6\frac{3}{4}$.

The second

The second (4) which is much like to it, as being received by the second above after the same manner, is 3 Inches on its convex Surface, and $2\frac{1}{2}$ Inches transversely at its middle. At its outside, being the inside of the Foot, it mutually receives the

The third

Third (5) which runs obliquely backward 2 Inches from the former: It has four Surfaces for Articulation; one where 'tis join'd with the third Bone of the former Rank; the second where it is join'd with the last nam'd Bone: In conjunction with the former it receives the 4th Bone of the *Metacarpus*; and at its outside the 6th. It terminates in an obtuse point behind, and has a *Sinus* betwixt the Articulation of the Bone of the *Metacarpus* and its extremity. The 2d weighs $6\frac{3}{4}$, and this 4.

*Bones of the
Metacarpus,
Tab. 2. G. 8.*

There are Six Bones in the *Metacarpus, per Ginglymum longum*; viz. they are receiv'd above by the Bones of the second Rank of the *Carpus*, and below by the Toes. They are all of much about the same Figure, but not of an equal length; somewhat flat before, and both convex behind; broader at the upper and lower extremity where they touch one another, and narrow in the middle.

The first on the outside is 3 Inches long, and $4\frac{1}{2}$ Inches round its middle, and articulated with the external part of the outer Bone of the second Rank of the *Carpus*; in weight $3\frac{3}{4}$.

The second is 4 Inches long, and $5\frac{1}{2}$ Inches round its middle; flat before, and more convex behind; and articulated with the middle of the foresaid Bone of the *Carpus*. It weighs $4\frac{3}{4}$.

The third is 5 Inches long, flat also before, and 7 Inches round its middle; articulated with the foresaid Bone of the *Carpus*, and occupying most of its inner Surface. It weighs $6\frac{3}{4}$.

The 4th is 5 Inches long, and 6 round its middle. This occupies the largest part of the middle Bone of the second Rank of the *Carpus*. It weighs $6\frac{3}{4}$.

The 5th is $4\frac{1}{2}$ Inches long, of the same bigness with the former; and occupies a part both of the middle and of the internal Bone of the second Rank of the *Carpus*; and weighs $4\frac{3}{4}$.

The

The sixth is $3 \frac{1}{2}$ Inches long, and $5 \frac{1}{2}$ Inches round its middle; and occupies the external part of the second Bone of the *Carpus*, and weighs $3 \frac{3}{4}$.

Each of the Toes of the ForeFoot consists of two thick short Bones; *The Bones of whereof the first of the external Toe is $5 \frac{1}{2}$ Inches round, and $1 \frac{1}{2}$ the Toes of the Inch long; the second about 1 Inch broad, and $\frac{1}{2}$ Inch long; weigh- Fore-Foot. ing $2 \frac{3}{4}$. The first Bone of the second Toe is 2 Inches long, and $6 \frac{1}{2}$ Tab. 2. G. c. Inch round; the second is $1 \frac{1}{2}$ Inch from the right to the left, and $\frac{1}{2}$ Inch from above to below; weighing $3 \frac{3}{4}$. The first Bone of the third Toe is 2 Inches long, and $7 \frac{1}{2}$ Inches round: The second Bone is divided into two in this Subject, in figure not unlike an Oxes Hoof, whether it be a *Lusus Naturæ*, or peculiar to all other Animals of this Species I know not. Weigh $4 \frac{3}{4}$. The first Bone of the fourth Toe is $2 \frac{1}{2}$ Inches long, and $5 \frac{1}{2}$ Inches round: The second Bone is in figure not unlike the former, but not divided; from the right to the left 2 Inches, and from above to behind 1 Inch. Weigh $4 \frac{3}{4}$. The first Bone of the fifth Toe is $2 \frac{1}{2}$ Inches long, and $4 \frac{1}{2}$ Inches round: Its second Bone is in figure like the former, but less, and divided. Weigh $3 \frac{3}{4}$. The first Bone of the sixth Toe is 2 Inches long, and $4 \frac{1}{2}$ Inches round; bigger at the upper and becoming narrower at its lower extremity, wherewith a very small Bone is articulated, and weighs $1 \frac{1}{2}$.*

All these are besides two *Ossa Sesamoidea*, which were affix'd to the lower part of the lower extremity of each Bone of the *Meta-* *The Ossa Sc-* *carpus*; each being about 1 Inch long, $\frac{1}{2}$ half Inch broad, Protube- *samoidea.* rant at the lower part, and concave at their upper or that side whereby they are articulated with the *Metacarpus*; separated from each other by an *Cartilage*, which did run down in the middle of this lower *Epiphysis* of the Bone in the *Metacarpus*. These *Ossa Sesamoidea* were very useful for supporting the Foot; for about their middle did all the four Hoofes of the Fore Foot terminate. They weigh each $3 \frac{1}{2}$.

The Hind Extremities consist of the *Ossa Innominata*, the Thigh Bone, the two Bones of the Leg, and the Foot.

The *Ossa Innominata* consisting, as in other Animals, of two large Bones, articulated behind with the *Os Sacrum* on each side, and *The Ossa In-* before with each other *per Synchondrosin*, as 'tis call'd, each may *nominata* be divided, as in Human Subjects, into the *Ilium*, or upper and *Fig. 4. 3.* external part, *Os Pubis*, or lower and fore part, and *Ischion*, or lower and back part: Though strictly speaking, these Bones here should only be divided into the *Ilium* and *Pubis*, there being no

The Pelvis.

remarkable part about them which deserves to be pointed out by the Name of *Iſchion*. Both theſe *Oſſa Innominata* join'd together, make up the *Pelvis*, which in Circumference is 4 Foot 6 Inches. From the *Os Sacrum* above B. to the upper part of the *Os Pubis* below C. it is 18 Inches, and from the Right D to the Left E. 17 Inches. The *Os Pubis* at the Articulation is from above C. to below F. 12 Inches; betwixt the two outer and lower Extremities of the *Ilion*, from the Right G. to the Left H. is $3\frac{1}{2}$ Foot; from the *Os Sacrum* above, along the Margin of the *Os Ilion*, down to the fore mention'd utmoſt Point is 2 foot $9\frac{1}{2}$ Inches G. H. and from that ſame Point H. to the *Acetabulum* which receives the *Femur* K. 1 foot. This *Acetabulum* is in Circumference, round the External Edge, 18 Inches. The breadth of the *Os Ilion* from the External Edge H. to the ſide of the *Pelvis* E. is 13 Inches. Round the Neck of the *Ilion* above the *Acetabulum* M. M. is 14 Inches. The height of the *Oſſa Innominata*, from the upper part of the *Ilion* to the *Acetabulum*, 22 Inches. The breadth of the *Os Pubis* from the Articulation with its Partner, to the outſide N N. 8 Inches. The length of the Oval Hole for the *Muſculus Marſupialis* O O. $5\frac{1}{2}$, its breadth 4, its Circumference 12 Inches. Betwixt the lower and utmoſt Extremities of the *Os Pubis* behind, R. R. 17 Inches. Theſe *Oſſa Innominata* are flat before, ſtanding almoſt perpendicular with the two lower and utmoſt Extremities of the *Os Ilion* G. H. bending forward, having the *Os Pubis* aſcending obliquely, convex before, where join'd together, and concave behind. This aſcent of the *Os Pubis* is a further Argument, that this is no Retrocoi-ent Animal.

Femur.
Tab. 2. 1.

The *Femur* is 3 foot long with its upper *Epiphyſis* (1.) in circumference 15 Inches; the Neck below it is 13 Inches; the breadth from the great *Trochanter* (2.) on each ſide 10 Inches; below this *Trochanter* in circumference 18 Inches; about the middle 12 Inches; round above the lower *Epiphyſis* 16 Inches; round the lower *Epiphyſis* itſelf (3.) from the *Patella* (4.) on the outſide to its oppoſite part on the inſide, $18\frac{1}{2}$ Inches. Its Diameter, where articulated with the *Tibia* behind, is 7 Inches; having two Protuberances, whereof the External is $2\frac{1}{2}$, and the Internal $3\frac{1}{2}$ Inches. The Internal *Epiphyſis*, which is received by the *Tibia*, is from before to behind 7 Inches, and the External $5\frac{1}{2}$ Inches. The *Femur* is in general a long ſtreight Bone, having a big round Head (which in this Subject is ſeparated from its Body

Body by a Cartilage, still an Argument of the Youth of the Animal) receiv'd by the *Ossa Innominata* (1.) A large *Trochanter* on the outside, where the Bone is broadest; from thence in its descent it becomes smaller, flat before and behind, and thicker on the inside than the outside, near to an equal bigness, till it comes to the lower Extremity, where 'tis enlarg'd into two big *Epiphyses*, which are receiv'd by the *Tibia*, with a *Sinus* in the middle about one Inch deep, and as much Diameter. It sends forth a large Protuberance before, which is received by the

Rotula, or *Patella*, a Bone of a very rugous Surface, considerably Protuberant on the outside, being from above to below 8 Inches, and from the Right to the Left 6 Inches. It is articulated with the *Femur per Ginglymum*, having a Cavity on each side which receives, and a Protuberance in the middle receiv'd by the *Femur*. Rotula

The *Tibia* is in length, measuring behind, 22 Inches; its circumference at the upper *Epiphysis* 19 Inches, and at the Neck 17 Inches. Before it has a large Depression for facilitating the Motion of the *Patella*; of a very rugous Surface, for Insertion of the *Extensores Tibia*. 'Tis almost Semicircular before, and flat behind: Its circumference about the middle is $9\frac{1}{2}$ Inches, and at the lower Extremity, where it again meets with the *Fibula*, and where it receives the *Astragalus*, 12 Inches. Tibia.

The *Fibula* is 21 Inches long; $5\frac{1}{2}$ Inches round above, where receiv'd by the *Tibia*; 3 Inches about the middle; and 5 Inches at the lower part, where it receives the *Tibia*. Its *Epiphysis* which forms the External Ankle, or *Maleolus*, measuring from before to behind along its outer Surface, is $5\frac{1}{2}$ Inches. Fibula.

The Bones of the hind Foot consist of those of the *Tarsus*, *Metatarsus*, and Toes. The *Tarsus* consists of 6 Bones, whereof The Bones of the Hind Foot ..

The first is call'd *Astragalus* (1.) This is articulated above with the *Tibia*, having a Depression in the middle 3 Inches, which receives, and two Protuberances at the Sides, which are receiv'd by the *Tibia*, $3\frac{1}{2}$ Inches. It receives the *Talus* below with a Surface 4 Inches Diameter. On the inside it sends forth a large Protuberance; and on the outside both it and the *Talus* are received by the External *Maleolus* for the space of 2 Inches. Before, 'tis receiv'd by the *Os Naviculare* during the space of $4\frac{1}{2}$ Inches. It is in Weight 6 $\frac{3}{4}$. Astragalus.
Tab. 4. Fig. 9.

The

Talus.
Fig. 7.

The *Talus* (a.) is a very irregular Bone; it is Protuberant behind from the *Astragalus* $4\frac{1}{2}$ Inches. This Protuberance is in circumference at the Extremity 10 Inches, and at its Neck 8 Inches: Below it is very rugous on the inside. It sends forth a Protuberance, which is received by the *Astragalus*, as in Human Subjects. It has three remarkable Surfaces; viz. one upon which the *Astragalus* rests, at its upper side; one at the fore-part, articulated with the *Ossa Cuneiformia*; and the outside, for the *Fibula*. It weighs 1 lb.

Os Naviculare.
Fig. 9.

The *Os Naviculare* is $10\frac{1}{2}$ Inches in Circumference, one Inch thick, concave behind (2.) where it receives the *Astragalus*, and convex before, with its different Surfaces (3.) viz. one whereby it is articulated with the Bone of the Toe on the inside, and one for each of the three *Wedge-like* Bones. It weighs $4\frac{3}{4}$.

Ossa Cuneiformia.

The Bones of the second Rank of the *Tarsus* are call'd the Three *Wedge-like* Bones, two of which are articulated at the back-part with the *Os Naviculare*, as is said, and the third partly with the *Talus*, and partly with the *Os Naviculare*; each of them is about 1 Inch thick: That on the inner Side (4.) is the least, being from the Right to the Left one Inch thick, in Weight $3i\beta$: The middle 2 Inches (5.) in weight $3ij$; and that on the outside (6.) $3\frac{1}{2}$ Inches, in weight $3iij$. This last has two Surfaces at the fore-part, whereby 'tis articulated with the two utmost Bones of the *Metatarsus*. The middle Bone of the *Tarsus* being only receiv'd by the middle Bone of the *Metatarsus*.

The Bones of the Metatarsus.

The External Bone of the *Metatarsus* is very irregular: It is articulated behind with the External *Os Cuneiforme*, where 'tis about 2 Inches from above to below; from whence (its External Surface being very rugous) it becomes gradually smaller; being somewhat Concave below, and Protuberant above, till it terminates in a round Extremity. In Weight $3iij\beta$.

The second is a short thick Bone, 8 Inches in Circumference, and $2\frac{1}{2}$ Inches long; in weight $3ij\beta$. This receives the first Bone of the Toe, which is $4\frac{1}{2}$ Inches in Circumference, and 2 long; and receives the second Bone of the same Toe, being 3 in Circumference, and $1\frac{1}{2}$ long; greater at its upper, and smaller at its lower Extremity, to which is affix'd a small Bone. These Weigh $3iij\beta$.

The middle Bone of the *Metatarsus* is the largest of all those belonging to the Toe, being 7 Inches round, and 5 long, $3iij$ in Weight. It receives the first Bone of the Toe, which is $4\frac{1}{2}$ Inches round, and $2\frac{1}{2}$ long; to which also is join'd another small Bone to make up the Extremity: In Weight both $3iij$.

The

The two Bones of the *Metatarsus* remaining are thin, broad, and irregular; the first whereof is $2\frac{1}{2}$ Inches broad, and $2\frac{1}{4}$ long; weighing each $\frac{3}{4}$ to which also adheres a small Bone, as in the former Toe, but less. The second and last of the *Metatarsus* on the inside is two Inches broad, and as much long, thin like the former, having a small Protuberance adjoin'd instead of a Toe. The Bones of the 4th Toe weigh $\frac{3}{4}$ ß, and the 5th $\frac{3}{4}$.

I once designed to have compar'd more particularly the Bones now describ'd, with those of *Tentzelius* and Dr. *Moulin's*: But since both these Treatises have been already communicated to the R. S. and I doubt not are in the Hands of most of the Honourable Members thereof; and since I have already insisted longer upon these, than I suppose you expected, I shall only put you in mind in few Words, that *Tentzelius* tells his Friend, that in digging in a Hill near *Erfurt* in *Germany* for a fine white Sand, there were found several huge Bones, first mistaken for a Giants; but upon tryal, and the perusal of Dr. *Moulin's* Treatises, known to be the Bones of an *Elephant*: And that among the rest there were found the Head 42 Inches Diameter; two Tusks $2\frac{1}{2}$ Spans large, and 8 foot long; four Grinders, each 12 lb. the *Humerus* 4 foot $2\frac{1}{2}$ Spans; the *Vertebra* of the Neck, each 4 Spans in Circumference, and 2 Spans high; the *Ossa innominata* $2\frac{1}{2}$ foot long; with the Head of the *Femur* inserted in the *Acetabulum*, and part of the *Tibia* 22 Inches at the biggest, and 17 at the smallest part: That they were obliged to dig 24 foot deep, before they could get out the Head; that the Bones lay in such a Posture, as betoken its being over-whelm'd, or having had great Strugglings while a dying; viz. the Left fore Foot stretch'd forward to the side of the Head, which lay toward the North, the Right inclining backward under the Body; the Left hind Foot drawn in toward the Body, and the Right distorted here and there, out of its Natural Posture. From all which he concludes this to have been the largest *Elephant* that ever was seen in *Europe*; and that it could be brought hither by no other means than the Flood, both from the Preternatural posture of the Body, and from the different *Strata* of Earth lying above it, without the least sign of having been digg'd to bury it.

Comparison
of these Bones
with those
treated of by
Tentzelius.

A Table containing the particular Dimensions of the Vertebrae and Ribs, and Weight of all the Bones of the Elephant.

The Bones of the Head.

Upper Jaw ———

Lower Jaw ———

lb

66

45

The Vertebra of the Tail.

Numb. 3.

Length.

Breadth.

Inch.

Inch.

The Vertebra of the Neck.

Weight. Length of Spi-

nal Process.

Numb. lb 3. 3. Inch.

1 — 1 13 —

2 — 1 6 4 —

3 — 13 4 — $\frac{3}{4}$

4 — 13 4 — $\frac{1}{2}$

5 — 14 4 — $1\frac{1}{2}$

6 — 14 6 — 3

7 — 1 — 5

7 10 6

1 — 16 — 2 — 6.

2 — 8 — — 5 $\frac{1}{2}$

3 — — — — 5

4 — 6 — — 4 $\frac{1}{2}$

7 — — — — 4

8 — 5 — — —

9 — 4 — — 3 $\frac{1}{2}$

10 — — — — 3

11 — 3 — — 2 $\frac{1}{2}$

13 — 2 $\frac{1}{2}$ — — —

14 — 2 $\frac{1}{2}$ — — 1 $\frac{1}{2}$

15 — — — — 1

16 — 1 $\frac{1}{2}$ — — 2 $\frac{1}{2}$

17 — 1 — — —

18 — — — 1 $\frac{1}{2}$ —

20 — — — 1 $\frac{1}{2}$ —

21 — — — 1 $\frac{1}{2}$ —

22 — — — 1 — 2 $\frac{1}{4}$

23 — $\frac{3}{4}$ — — 2

24 — — — 1 $\frac{1}{4}$ —

25 — $\frac{1}{2}$ — — $\frac{1}{2}$

29 — $\frac{3}{4}$ — — $\frac{3}{4}$

The Vertebra of the Back.

Numb. Weight. Length of Spi-

nal Process.

Breadth

No. lb. 3. 3. Inch.

Inch.

1 2 4 8 2 —

2 2 2 12 3 $\frac{1}{2}$ —

3 2 13 4 $\frac{1}{2}$ —

4 1 5 — —

5 1 4 2 12 3 $\frac{1}{2}$ —

6 1 2 3 11 $\frac{1}{2}$ 3 —

7 15 6 11 —

8 14 10 $\frac{1}{2}$ 2 $\frac{1}{2}$ —

9 14 10 —

10 — — — —

11 — — — —

12 13 9 $\frac{1}{2}$ 2 —

13 — 9 — —

14 — 6 $\frac{1}{2}$ 1 $\frac{1}{2}$ —

15 — 6 1 $\frac{1}{2}$ —

16 — 5 2 —

17 — 5 — —

18 2 4 $\frac{1}{2}$ —

19 4 3 —

20 8 7

The Vertebra of the Loyns.

1 — 13 4 3. Weight of Ribs

2 — 12 7 Tail 4 — 2 7 13

3 — 11 — —

2 5 3

The Ribs.

Weight. A. of inner

Surface.

L. between

Extrem.

Breadth

No. lb. 3. 3. Feet. Inch.

Feet. Inch.

Inch.

1 13 1 5 1 4 4

2 12 4 9 8 3

3 1 2 11 $\frac{1}{2}$ 10 —

4 4 2 2 2 —

5 8 4 6 3 2 $\frac{1}{2}$

6 2 3 3 $\frac{1}{2}$ 2 $\frac{1}{4}$

7 1 5 8 3 $\frac{1}{2}$ 2 $\frac{1}{4}$

8 4 6 10 4 $\frac{1}{2}$ —

9 3 5 —

10 15 9 3 —

11 14 4 7 1 —

12 13 4 5 1 —

13 12 4 4 $\frac{1}{2}$ 1 11 $\frac{1}{2}$

14 10 6 1 $\frac{1}{2}$ 1 10 4

15 9 5 5 1 8 8

16 5 5 8 7 1

17 3 2 5 4 $\frac{1}{2}$ —

18 2 1 — —

16 15 6

16 15 6

32 15 4

4 2 7 13

The

The Skeleton of the Elephant consists of the Bones of

The Head divided into those of the

Upper Jaw, viz.

Calvaria, or upper and back part	1
Frons, or upper and fore part	1
Two Maxillary Bones	2
Two Bones of the Palate	2
Two Zygomatic Bones	2
Two Styloid Processes	2
Two Tusks	2
Four Grinders	4

15 3 3 3

Lower Jaw

Four Grinders

66

45

21 118

The Trunk composed of the

Spine consisting of the Vertebra of the

Neck	7	7	10	6
Back	19	20	8	7
Loyns	3	2	5	3
Os Sacrum	5	4	0	0
Tail	29	4	2	7

Ribs, 19 Pairs 38 33 15 4

Sternum 4 3 00 0

105 75 11 3 1

The Fore Extremities

Scapula	2	19	08	0	0
Humerus	2	16			
Cubitus and Radius	4	15			
Carpus, Six on each Foot	12	3	12		
Metacarpus	12	3	4		
Toes	24	2	3		
Os Sessamoides	24		6		

80 60 1

The Hind Extremities

Os Innominata, viz.

Ilion 2 28 00

Pubis 2 16

Femur, or Thigh Bone 4 13 4

Tibia and Fibula, or Leg and Spit Bone 2 12

Patella, or Knee Pan, 12 5 10

Tarsus 12 1 06

Metatarsus 20 1 02 1/2

Toes 54 66 2 1/2

Summa Totalis

260 312 14 7 1

This is the Total Sum of the weight of the Bones.

N 2

I

The Method
of mounting
the Skeleton.

I come now to the last thing I propos'd, which is the Method I us'd in mounting the Skeleton; and because Dr. *Moulins's* way of nailing a Plate of Iron to the Roof of the Mouth, in which the Iron Rod that run through the *Vertebra* of the Neck was fastned, would have been inconvenient, by spoiling the back-part of the Skull, obstructing its View, and making the Head look too much forward, which was the fault of his Skeleton, as represented by the Figure, I contriv'd another, which is as follows.

Connexion
of the Head.

There was an Iron Rod made about the bigness of one for a Bed, as long as the *Elephant*, from the Forehead to the Point of the Tail, being 14 Foot, which pass'd in at the fore-part of the Skull above the Hole for the Root of the Trunk, and run back amidst the fore *Cellules*, passing along the lower part of the Seat of the Brain, and going out at the lower part of the Hole for the Spinal Marrow; and lest the inconveniency of its Weight (as Dr. *Moulins* fear'd) should happen to break the tender *Lamina*, there was another Rod of the same bigness, which pass'd in at the one side of the Head, where the Depression is for Insertion of the Muscles of the Lower Jaw and *Proboscis*, and run through the *Cellules* at the side, going transversely along the lower part of the Seat of the Brain below the former, and passing out at the other side; by which this Rod, from the Right to the Left, eases the Burthen of the other, in supporting the Head on both sides, as well as the other did before. And lest any of these should slide out, I caus'd to be screw'd a Piece of Iron upon each Extremity of that which pass'd from the Right to the Left, and upon the fore end of that which did run from before to behind. Afterwards the second *Vertebra* in the middle of its Tooth, and all the other following *Vertebrae* were perforated in the Center of their Bodies; and to make the Head still more steady, the Base of the Skull was twice perforated on each side of the Hole for the Spinal Marrow; and a strong Wire being pass'd through these Holes, it run from the Right to the Left above the Rod, and kept it firm, lest it should have bended, and suffer'd the Head to incline too much downward by its Weight.

Connexion
of the lower
Jaw.

The joining of the Lower Jaw, which is perhaps the most ponderous Bone in any Land Animal, was next to be consider'd; therefore two Wires were pass'd in at about one Inch distant from each other, running from above to below, to that part of the

the Base of the Skull (y) which is for Reception of the *Condyles*; *Tab. 3. Fi.* and the same two Wires having pass'd through two Holes, made 3. from before to behind in the *Condyles* themselves, both Extremities of the Wires were made to meet together at the upper and outer part of the *Condyles*, and so twisted and made firm. Being still suspicious that this would not be sufficient to support such a vast Weight, and fearing lest either the Base of the Skull or the *Condyles* might come to suffer, there was a Wire brought round the Margin of the so often mention'd great Hole in the *Os Maxilla Superioris*, which being folded, was twisted several times toward the *Processus Corona* in the lower Jaw (b.) where there were two Latchets, or Foldings of Wire plac'd in the inner side; the folded Wire from the *Os Maxilla* was brought in betwixt them, and a Pin pass'd through all three, to be taken out at pleasure. And lest these should not still be sufficient to support its Weight, there was provided in the third place a folded Wire from behind to before in the *Symphysis Menti* (h.) which passing in betwixt the *Fig. 9.* two *Ossa Palati* (b.) a Pin was put across them, to be taken out *Fig. 1.* at pleasure; which is such a Relief to the *Condyles*, that without making use of the Wires running from the *Os Maxilla* to the *Processus Corona*, we found it sufficient to support the Weight of the Jaw; and 'tis so much the more convenient, that by pulling out this Pin, the lower Jaw can be brought back and forward, to shew the Spectators its considerable Weight.

Being obliged to saw the Skull, in order to take out the Brains, *Connexion of* for fastning the upper part of it, there were two Wires plac'd at the back part of that which is below the Division; into which *the upper* are linked two other Wires, which reach to that part above the *part of the* Skull. Division, and are there receiv'd into two foldings of Wire plac'd there on purpose. The same Contrivance is also observ'd before; so that this upper part may either be laid back, to shew the Structure and Contrivance of the *Cellules*, or taken altogether off, as seems good.

The *Vertebra* being all perforated; my next Care was to have *The joining* the Ribs match'd and join'd; in order to which, having first suited *of the Ver-* them in Pairs, and fitted each Pair for its *vertebra*, I caus'd to be perforated each of their *Epiphyses* twice from above to below, *Ribs.* (once toward the fore, and once toward the back part) and the transverse *Processes* of the proper *Vertebra* opposite to the Holes of the Ribs; after the same manner; and then perforated the Ribs at the Extremity toward the *Vertebra*, and the *Sinus* of the *Vertebra*.

Vertebra (corresponding to the Rib) in toward its Body: After which a Wire two Inches long was fastned in the Body of the *Vertebra*, and Extremity of the Rib, and then both were brought together; which being done, the Wires were put into their respective Holes in the transverse *Processes* and Ribs, and both the ends of each of the two last Wires, being brought together at the upper part and Interstice betwixt the Ribs and transverse *Processes*, were twisted and made firm. Thus I continued to do throughout all the Nineteen Pairs.

Leather, in-
stead of Car-
tilages.

After this I provided some Jumps, or Leather, such as Shoe-makers use for the Heels of Shoes, because the Bend or Sole Leather us'd in mounting the Sceletons of other Animals, could not be so conveniently fitted as to its thickness. Having wetted and beat this Leather, it was shapen'd according to the bigness of each *Vertebra*, perforated in the middle, and put upon the Rod alternatively, first the *Vertebra*, and then the Leather, to supply the defect of the Cartilages, which were all lost in boiling, as usually happens, and was beat so close, that the oblique *Processes* of the *Vertebra* might meet. This was continued till all the *Vertebra* were upon the Rod, all along to the *Os Sacrum*; and because the first *Vertebra* is nothing concern'd with the Rod, 'twas convenient to pass a Wire betwixt the Scull and it on each side, that it might not remain loose, but be fix'd to the *Condyles*, by twisting and making fast the Wire.

Connexion
of the *Ossa*
Innominata.

I came next to the *Ossa innominata*, which had been disjoin'd in Boiling, both before or below at the *Os Pubis*, and above or behind at the *Os Sacrum*. I made two Rods of Iron to pass transversely from the one side (the one above, and the other below) through the *Os Sacrum* to the other. These were riveted on the back side at both ends, and then having perforated the *Os Sacrum* from above to below through the middle of its Body, it was also put upon the Rod for the Spine, which was a very difficult Task, because the Rod being thick was uneasy to bend, and the Situation of the *Os Sacrum* requir'd it to be bended precisely, betwixt the last of the *Vertebra Lumborum*, and the *Os Sacrum*. Neither was it easy to perforate the *Os Sacrum* itself, being obliged to make a Drill on purpose, there being no other Bone in the Body that requir'd one so long. After this I proceeded to put on the Bones of the Tail, and their Sham Cartilages alternatively, as they followed in order, till all the Rod was fill'd,

on whose Extremity another Piece of Iron was screw'd, to keep all firm and secure.

Afterwards a large Wire was passed from the fore to the hind part of the *Sternum*, whereby all its Bones were fix'd to one another; and to them were joined pieces of Bend Leather to supply the Cartilages, which had been first mangled by the Butchers, and then lost in the boiling. These I fitted to the Articulation of each Rib, whereto they were join'd; and perforating the Extremities of the Ribs twice, I past two Wires betwixt the Sham Cartilages and them, bringing the two ends together, twisting and fastening them on the inside, by which all the *Thorax* was mounted. And lest the Ribs thus fix'd at both Extremities should be too ready to move from before to behind, and *è contra*, each of the Ribs was perforated above toward the Back, and below toward the Belly, for receiving of Foldings and Latchets of Wires to be fastned in them. Then I provided two big Wires, each being folded twice, the length of the *Thorax*; one of which being pass'd through the last Rib, its two Parts being brought together, they were twisted several times, till it was brought opposite to the Latchet in the next Rib, within which the one part was pass'd, the other continuing without, and then twisting again, till it came to the third; it was so continued throughout all the Ribs, both above and below, to keep them firm and at a due distance. And thus you have the whole Trunk mounted.

*Connexion of
the Sternum,
and mounting
the Thorax.*

Next, I took the two *Scapulae*, as belonging to the upper Extremities; and lest they should be too weighty for the Ribs, if nail'd to them, as is usually done in other Sceletons, I thought fit to perforate both of them opposite to one another at their upper Margin, and to pass a good big Wire through one of the Perforations, which being folded, was twisted for the space of 20 Inches, *i. e.* from the *Scapula* on the one side, streight over the Back, passing in betwixt two of the *Vertebrae*, till it came to that on the other, where it was fastned. Afterward both the *Scapulae* were fastned, by bringing two folded Wires from the outside of each *Scapula*, through the first and third Rib, in whose inside they were fix'd; then was the Head of the *Scapula* perforated through the Margin which guards the *Humerus* at the fore and back-part.

*The Joining
of the Scapulae.*

The

Connexion
of the Hu-
merus.

The Head of the *Humerus* opposite to the middle of the Concave part in the *Epiphysis* of the *Scapula*, was four times perforated, twice toward the inside, and twice toward the outside; whereinto were put two folded Wires, whose Extremities were fix'd below at the foresaid inner and outer part, and into whose Foldings a large Pin pass'd from the Margin of the *Scapula* on the one side, to that on the other, (to be pull'd out at pleasure, for suspending of the *Humerus*.)

Cubitus
and Radius.

The *Cubitus* and *Radius* were join'd with the *Humerus*, thus: The *Cubitus* was perforated twice in the back part, at the beginning of the *Olecranon* on each side; where two Extremities of Wires being fix'd and riveted, they were brought through the upper part of the said *Olecranon*, and then twisted, till they came to the *Humerus*, which was perforated from the back-part, where the Depression for receiving the *Olecranon* is, to the fore part above the *Epiphysis* received by the *Cubitus* and *Radius*; through which Holes made pretty large, the Wires thus twisted were pass'd, the one to the *Radius* on the outside, and the other to the *Radius* on the inside; where they were introduc'd, and brought out at the back-part of the *Cubitus* below the *Olecranon* on each side, where their Extremities were riveted $2\frac{1}{2}$ Inches below their Insertion: By which means the Flexion and Extension can be easily shewn, because the Wires have sufficient space to move in their Passage through the *Humerus*, these Holes being made bigger on purpose, as is said. The lower *Epiphysis* of both *Cubitus* and *Radius* having been separated by boiling, as I have formerly observ'd, I was forc'd to perforate each of them below toward the *Carpus*, and pass a Wire obliquely upward, whereby to secure them: And because the *Radius* is distinct from the *Cubitus* below, there was a Wire passed from the one to the other, and riveted at each outside.

The Fore
Foot.

In joining the Bones of the Foot, I took special care to hide the Wires, so that none might appear to the Beholders. For doing whereof the *Cubitus* was twice perforated in the back-part of the *Epiphysis*, about 1 Inch above the Articulation with the Bone of the *Carpus* on the outside, and the *Radius* in the inside and back-part, after the same manner: Both which Perforations were continued through the two Bones of the first Rank of the *Carpus*. Afterwards the External Bone was perforated a third time; all which run from above to below, to the first, second, and third Bone of the second Rank. Which being done, two folded

folded Wires were pass'd in at the four Holes of the back part of the *Cubitus* and *Radius*, where their Duplicatures were formed; and the fifth Wire put into the Hole made in the middle of the External Bone of the first Rank of the *Carpus*, was continued with the rest through the Bones of the second Rank to those of the *Metacarpus*, where they run from one Extremity to another; that is to say, the outer part of the folded Wire from the *Cubitus*, did run down the outside of the External Bones of the first and second Rank of the *Carpus*, to the External Bone of the *Metacarpus*, all along, till it was brought out at the Extremity of the furthest Bone of the Toe belonging thereto; and the inner part of the same Wire passing from the *Cubitus* through the same two Bones of the *Carpus*, ran down to the third Bone of the *Metacarpus* from the outside, from whence 'twas convey'd to the Extremity of its Toe, and there riveted. The third Wire pass'd from its entry in the middle of the External Bone of the first rank of the *Carpus*, to that of the second, and from thence down to the second Bone of the *Metacarpus*, from the outside, to the Extremity of its Toe, where it was fastned; and the folded Wire from the back-part of the *Radius* pass'd down at two Places through the middle Bone of the first rank of the *Carpus*, to that of the second rank, and from thence to the fourth and fifth Bones of the *Metacarpus* from the outside, and still forward to the Extremities of their Toes, where they were fix'd. This done, I caus'd to be perforated the External Bones of the *Carpus* twice, *i. e.* toward their fore and back part, as also the *Metacarpus* at the upper and lower Extremity; passing the Drills from the outside to the inner of each Bone, or from the Right to the Left, by which the Bones above were as well join'd with their Sides, as with those below them; so that each was kept secure in its Place, especially the Bones of the *Metacarpus*, which would have too readily separated from each other, and endanger'd the breaking the Wires, by which they were join'd with those above. Since the third Bone of the first rank of the *Carpus* lies, as it were, at the side of both Ranks, therefore I thought it convenient to pass the two Extremities of the Wire, which run from the right to the left, in the first Rank, that so it might be fastned with its Partner on the inside; and since the Internal Bone of the *Metacarpus* yet remain'd to be join'd, this inner Bone of the *Carpus* was again perforated, and a Wire brought from it to the inner Bone of the second Rank, and from

O

thence

thence to the said Bone of the *Metacarpus* with its Toe, where it was fastned.

*Connexion of
the Femur.*

The upper *Epiphysis* of the *Femur* having also separated by boiling, it was requisite to perforate its Head four times, for the immision of two folded Wires, which were brought obliquely down the inner and outer side to its Neck, where their Extremities were twisted and secured. Afterward it was perforated in the middle four times more, for two other folded Wires, which were once or twice twisted, and their Extremities put through the foresaid Holes to the inner and outer part of the Neck of the *Femur*, as before, there to be made fast. The *Acetabulum* was perforated in the bottom, and these two Foldings pass'd through it; whereinto was put a Pin, at the back-part of the *Ossa innominata*, to be pull'd out at pleasure, and the Thigh suspended as the *Humerus*.

*Of the Tibia
and Fibula.*

Two folded and twisted Wires were pass'd in at the *Epiphysis*, on each side of the *Spina*, in the middle of the *Tibia*, and their Extremities brought out at its upper and back-part, where they were riveted: Afterward the lower *Epiphysis* at the *Femur* was perforated from the right to the left, and a Pin pass'd from the out-side, through the Foldings of the Wires from the *Tibia*, to the in-side, (whereby the Flexion and Extension is most conveniently shewn,) to be taken out at pleasure. The *Perone* was fix'd to the *Tibia* at the upper part, by a Pin passing obliquely upward from the one to the other; and the *Patella* fastned to the fore-part of the *Femur*, by a Pin passing directly inward from before to behind.

*Of the Hind
Foot.*

The lower part of the *Perone* forming the External *Malleolus*, is perforated from without to within, as is the opposite part of the *Tibia* forming the Internal one; likewise the *Astragalus* is perforated from the right to the left, corresponding to these two Holes, for the immision of a Pin, whereby the Foot is join'd to the *Tibia*, to be pull'd out at pleasure. The *Astragalus* is join'd to the *Talus* by a Pin, pass'd from the upper and middle part of the one, to the lower part of the other, where it is riveted. The *Astragalus* is thrice perforated before; into two of which Holes a folded Wire is pass'd, which goes forward through the *Oss Naviculare* to the Bones of the *Metacarpus* of the second and third Toe from the inside, at whose Extremities they are fix'd. The third Wire runs from the *Astragalus* to the *Oss Naviculare*, and the third *Oss Cuneiforme*, to the fourth Toe. The said *Oss Naviculare*

is

is perforated on the inside for a Wire, which runs through the Bone of the *Metacarpus* and inner Toe. The third *Os Cuneiforme* is perforated for a Wire which passes through the Bone of the *Metacarpus* and outer Toe. The three *Offa Cuneiformia* are join'd to each other by a folded Wire, which runs twice from their outside to the inside, where they are secured.

Sir, By the Opportunity I have had of preparing and joining these Bones, it may be expected I should give some Account of their Structure: But as the design of preserving the Scleron entire gave me no Liberty to go any further than their External Surface, so it cannot be expected I could dive any deeper in the Knowledge of them. *Tentzelius* says, *Omnia isthac Offa porosa sunt & rimosa*; and I may add, *Levia* too: For there is nothing about them to be seen of that Solidity and Compactness, that smoothness of Surface, and Whiteness, which is observable in other Quadrupeds of the larger size, such as Oxen, Horses, Harts, &c. or smaller, as Sheep, Dogs, Cats, &c. And I should have readily attributed this to the Youth of the Animal, had not *Tentzelius* from his Subject, suppos'd to be 200 Years Old, told the same. And this differs much from the Account of the *Behemoth* in *Job*, whose Bones are said to be as strong pieces of Brass, and Bars of Iron. The *Lamina* of the Head were thin and solid; the External Table thin and more ponderous; the Teeth exceeding solid and ponderous: So that from the computation of the Weight of the upper part, which was taken off by the Saw, as in *Tab. 3. Fig. 5. and 6.* which is only 6 lb. weight, I may reckon all the Head, which weighs 66 lb. beside the Teeth, not to weigh above 24 lb. at most; which well agrees with what *Tentzelius* says, that each of the *Dentes Molares* were 12 lb. weight, and that of all the 45 lb. which the Lower Jaw weighs, the rest of the Bone beside the Grinders do not exceed 12 or 16 lb. For its External Surface seems to be both porous and rimous, as is said; and at perforating the *Condyles* seem'd to be very spongy, as were the *Ribs, Femur, Tibia, &c.* where, after the Drill had pass'd the External *Lamina*, which was very thin, it would have run forward as if it had been through so much Moss. When the *Epi-physis* came off the Thigh Bone, it resembled very much the *Epi-physis* of the *Femur* in Man; its minute *Cellules* were not so big as those of an Oxe, and the *Lamina* which circumscrib'd them, not by much so solid. The *Humerus* indeed both above and below was

O 2

much

much harder ; it did heat the Drill in passing : And there may be some reason for that too ; viz. that since the Progression of most Quadrupeds chiefly depends upon a more frequent motion of the Fore than Hind Limbs, it does much more here, where the Head is proportionably more heavy than in other Animals. And this perhaps is the reason too, why the Fore Limbs in this Animal are brought so far forward ; for measuring in a streight Line from the *Humerus* above to the *Carpus* below, and bringing another Line directly backward at the Articulation betwixt the *Humerus* and *Cubitus*, from the perpendicular Line before to the point of the *Olecranon* behind, it is 20 Inches ; which is the reason why some believe my Engraver has made the fore Limbs of the Sceleton to bend too much at the Articulation. The Bones of the *Carpus* are pretty solid, and by Perforation they seem only to have a little spongiosity about the middle : All the rest of the Bones of the fore Foot are spongy. The *Astragalus*, *Os Naviculare*, and *Ossa Cuneiformia*, are more solid ; but the *Talus* and other Bones of the hind Foot spongy. The Spine was spongy, as is usual ; the *Ossa Innominata* of a middle Consistence ; and the *Scapula* very thin, but solid toward its Neck. I cannot positively determine the Cavities for the Marrow, nor quantity of it ; but by comparing the Dimensions with the Weight and small quantity of Fat to be seen at the boiling, we may suppose it not to have been much in this Animal : I know not how it may be in others of this Species.

I must not forget to tell you, that when I weighed the Bones, it was immediately before they were joined ; so that their weight was much diminish'd, in respect of what it was when they were newly boil'd. The weight is 316. to 1 lb. and the measure, according to the *English* Yard, 12 Inches to a Foot, and 12 Lines to an Inch.

And thus, Sir, I have finish'd these my Weak Endéavours : The Undertaking, I doubt, will seem bold to some, and rash to others, and the Performance mean. But the many Obligations you have laid upon me, and the frequent Marks of Esteem I have received in your several Letters, made me pass over all Obstacles, Reflections, and Discouragements, when to serve you and your Honourable Society was my only Design. I have rather chosen to address you in a plain and common Stile, than give the least suspicion of Disingenuity in a finer Language ; esp. cially since

since it is History I have written, where Matter of Fact, and not Romance, where Eloquence, is the chief Design.

The Copper Plates, which at my own Charges I have caused to be engraven here, I acknowledge might have been done finer in *London*; but since I had the Original by me, whereby I was able from time to time to correct in the Ingraving what Errors happen'd in drawing the Figures, I rather chose to have them done by me here: And tho' the Draughts of the Engraver be course, yet I have endeavour'd what in me lay to have the Figures true and well proportion'd. Wishing all Health and Happiness to your self, Prosperity and Success to your Honourable and Famous Society. I continue,

Sir,

Your most humble, and

From my House at
Dundee, April 27.
1709.

most obliged Servant,

PATRICK BLAIR.

The

The Explication of the Tables.

T A B U L A I.

Represents the stuff'd Skin of the Elephant, as it now stands in our Hall, with an Account of its particular Dimensions.

	Feet. Inches.	
A. A. The Height of the <i>Elephant</i> at the Fore Feet.	8	6
B. B. Its Height at the Hind Feet.	9	
C. C. Its Length.	10	
C. D. The Length of the Tail.	4	3
E. E. The Circumference of the Belly.	14	
F. F. From the top of the Head to the Point of the <i>Proboscis</i> .	8	
G. F. The length of the <i>Proboscis</i> .	4	6
H. H. The distance between the Forehead and lower Jaw.	2	3
F. I. From the top of the Head to the lower Jaw.	4	6
K. K. The length of the Ear.	1	7
L. L. Its breadth.	1	5
M. The Orifice of the <i>Meatus Auditorius</i> .		
N. N. The Circumference of the fore Foot round the Hoofs.	3	10 $\frac{1}{2}$
a. The Fore Hoof fore-shorned.		5
b. The middle External Hoof.		5
c. The third External Hoof.		4 $\frac{1}{2}$
<i>Note</i> , That neither the Diameter of the fore Foot from before to behind, which was ———		
	1	4 $\frac{1}{2}$
nor from the right to the left, which was ———	1	2
can be so here.		
O. O. The Circumference of the fore Foot at the upper Joint.	4	3
P. P. At the Articulation with the <i>Carpus</i> .	2	6 $\frac{1}{2}$
Q. Q. The Circumference of the hind Foot round the Hoofs.	3	4
The Diameter from before to behind.		
From the right to the left.		
a. The breadth of the fore Hoof.		3
b. The breadth of the outer Hoof.		4
c. The breadth of the third Hoof.		4
R. R. The Circumference of the hind Leg.	2	2
		S.

- S. The Mouth.
 T. The Tusks broken off by the middle.
 U. The Eye.
 X. Represents the Scabs about the Belly.
 Y. Y. The Depressions in the Skin through the folding of the *Proboscis*.
 a. A Protuberance first occasion'd by the *Offa Innominata*, when the Animal was alive and very lean, and still remaining in the Skin.
 b. A Protuberance in the forepart of the Thigh.
 c. The lower Joint of the fore Foot, where there is a Depression in the Skin.
 d. d. Several Wrinkles in the stuff'd Skin.

T A B U L A II.

Represents the Sceleton of the Elephant, as it was mounted by my Direction, and now stands in the Repository of Rarities in Dundee.

- A. The Scull taken in Prophile, whereby a part of the fore side is foreshortned.
 a. The Hole for the Root of the Trunk foreshortned.
 b. b. The two *Offa Palati*.
 c. c. The Two Tusks as they proceed from the *Offa Palati*.
 d. d. The broken off Extremities of the Tusks.
 e. The Grinders of the Upper Jaw.
 f. The fore Grinder of the Lower Jaw.
 g. The undulating Lines of the lower Surface of the Grinders of the Upper Jaw.
 h. The inner Grinder of the Lower Jaw.
 i. Part of the *Os Mala*.
 k. Its Articulation with the *Os Zygomaticum*.
 l. The *Os Zygomaticum*.
 m. The Orbit of the Eye.
 n. Its upper Protuberance.
 o. Its middle Protuberance where the *Trochlea* is inserted.
 p. Its lower Protuberance.
 q. A *Sinus* at the bottom of the Orbit.
 r. r. A Depression fit for lodging the Muscles of the lower Jaw and *Proboscis*.
 s. The Orifice of the *Meatus Auditorius*.
 t. t. The Articulation of the *Os Calvaria* with the *Os Zygomaticum*.
 u. The *Processus Coronae* of the lower Jaw.

x. The

- x. The Insertion of the *Musculus Masseter*
- y. The space for the Mouth betwixt the *Os Palati* and lower Jaw.
- z. An Orifice from which the *Nervus Maxillaris inferior* proceeds.
- B. The Vertebra of the Neck.**
1. The first Vertebra.
 2. The second Vertebra, or Tooth which rises higher than the rest.
 3. The third Vertebra having scarce any Spinal Process.
 4. The 4th, whose Spinal Process is not yet seen.
 5. The 5th, with the Spinal Process beginning to appear.
 6. The 6th, whose Spinal Process ascends higher, and is remarkable at its fore-part, as in *Tab. 4.*
 7. The 7th, whose Spinal Process still ascends, and with whose back-part the first Rib is articulated.
- C. The Vertebra of the Back.**
- 1.—13. Their *Processus Spinosi*, which have no Protuberance at their Extremity, whereof 1.—C. are the longest, and C.—13. become gradually shorter.
- D. The Spinal Processes of all the rest of the Vertebra to the *Os Sacrum* which are shorned by degrees.**
- xxxxx &c. the oblique Processes of the Vertebra.
- E. The Scapula.**
- a. a. The spongy Margin of the Scapula.
- b. b. Its *Processus Spinosus* sending forward a Protuberance.
- c. c. Its Neck.
- d. d. The *Epiphysis* which receives the *Humerus*.
- e. e. &c. The Ribs.
- f. f. &c. The Ribs which appear on the opposite side.
- g. g. The Cartilages of the *Sternum*.
- h. h. The Bones of the *Sternum*.
- i. i. i. The three Ribs which have no Cartilages.
- l. l. l. The Bodies of the three *Vertebra Lumborum*.
- F. The *Humerus*.**
1. Its upper part, spongy and rugous, for the Insertion of Tendons.
 2. Its middle part more solid.
 3. A large oblique *Sinus* for lodging the *Biceps*.
 4. Its lower Extremity articulated with the *Cubitus* and *Radius*.
- G. The *Cubitus* and *Radius*.**
1. The *Olecranon*.
 2. An hollowness on the outside of the *Cubitus*.
 3. The *Radius*.
 4. Its lower *Epiphysis*, rugous, and separated from it by a Suture.
 5. The lower *Epiphysis* of the *Cubitus*, separated likewise by a Suture.
- 6 6 6. Three Bones of the first Rank of the *Carpus*.

- | | |
|--------------------------------------|---|
| Three Bones of the se- | 1. The <i>Epiphysis</i> receiv'd by the |
| Rank. | <i>Offa Innominata</i> , and articu- |
| 1. The Bones of the <i>Meta-</i> | lated with the <i>Femur</i> by a |
| <i>carpus</i> . | Suture. |
| 9—9. The first Bones of the | 2. The <i>Trochanter major</i> . |
| Toes. | 3. The lower <i>Epiphysis</i> . |
| 10—10. The second Bones of | 4. The <i>Patella</i> . |
| the Toes. | M. The <i>Tibia</i> . |
| H. H. The <i>Offa Innominata</i> re- | 1. <i>Perone</i> . |
| presented in <i>Profile</i> . | 2. The <i>Talus</i> . |
| I. The <i>Pelvis</i> . | 3. The Bones of the <i>Tarsus</i> . |
| K. The Tail. | 4. The Bones of the <i>Metatarsus</i> . |
| L. L. The two Thigh Bones. | 5. The Bones of the Toes. |

TABULA III.

Represents the Head in different Views, Parts of the Ear, Proboscis, and Uterus.

- Figure 1. Represents the fore-part of the Head.
- | | |
|--|--|
| a. The Hole for the Root of the Trunk. | g. The upper Production of the <i>Sinus</i> where the Eye is lodg'd. |
| b. The lower part of the <i>Os Palati</i> , over which hangs the <i>Proboscis</i> . | h. The Beginnings of the <i>Lamina</i> which run betwixt the two Tables of the Scull, and here appear in the bottom of the Hole for the Root of the <i>Proboscis</i> . |
| c. c. A Depression of the Bone on each side, for lodging of the Muscles of the lower Jaw. | i. The <i>Os Vomeris</i> , to which the <i>Cartilaginous Septum</i> of the <i>Proboscis</i> was adherent. |
| d. d. The two Eminences on each side at the top of the Head. | k. The beginning of the Depression of the <i>Os Palati</i> . |
| e. A Depression in the middle betwixt these two Eminences. | l. The middle of the <i>Sinus</i> for the Orbit of the Eye. |
| f. f. Two Beginnings of the Angles for forming the Depressions for the Muscles of the lower Jaw, betwixt which the Surface of the Bone begins to be plain. | m. The Articulation of the two <i>Offa Palati</i> . |
| | n. n. The Articulation of the <i>Os Maxilla</i> with the <i>Os Palati</i> ; where also is a <i>Crena</i> for containing the Blood Vessels, as they |

they go to the nourishment of the *Proboscis*.

e. o. The Place where the Tusks proceed from the *Os Palati*.

p. p. The upper part of the Articulation of the *Os Maxilla* with the *Os Palati*.

q. q. The broken Extremities of the Tusks.

r. r. A great Oval Hole in the *Os Maxilla*, through which a considerable Branch of the 5th Pair of Nerves, and a large Artery from the *Arteria dura Marris* pass to and are dispers'd in the *Proboscis*, and by which a big Vein returns and joins to the *Vena jugularis*.

s. The *Os Zygomaticum*.

r. The middle Production for the Orbit of the Eye.

Figure 2. represents the Side of the Head.

a. The beginning of the Depression for the Muscles of the lower Jaw and *Proboscis*.

b. The Insertion of the *Retractor Proboscidis*.

c. The Insertion of the *Musculus Temporalis*.

d. The bottom of the Orbit of the Eye.

e. Its upper Production.

f. Its lower Production.

g. The Articulation of the *Os Maxilla* with the *Os Zygomaticum*.

h. The *Os Zygomaticum*.

i. The Articulation of the *Zygomaticum* with the *Varia*.

k. The Orifice of the *Auditorius*.

l. One of the *Condyles* of the *Occiput*, which is articulated with the first *Vertebra*.

m. The Orifice of the large Oval Hole in the *Os Maxilla*.

n. The fore Grinder in the upper Jaw.

o. The hind Grinder, or rather Wedge for keeping the fore Grinder fast.

p. The undulate Lines in the lower Surface of the Teeth.

q. The beginning of the Tusks as they proceed from the *Os Palati*.

r. Their broken off Extremities.

s. The *Sinus* in the bottom of the Orbit of the Eye for the *Nervus Opticus*.

Fig 3. represents the back-part of the Head.

a. a. The two Eminences at the upper part of the Head enlarg'd, whereby the *Sinus* betwixt them becomes narrower and deeper.

b. The *Sinus* betwixt these Eminences shortned.

c. c. The two *Condyles* which are receiv'd by the first *Vertebra*.

d. The Hole for the Spinal Marrow.

e. e. Two Protuberances above the *Meatus Auditorius*.

f. The

- f. The Orifice of the *Atrius Auditorius*.
- g. A *Sinus* whence the *Processus Styloides* arises, which is shewn by itself.
- h. The Cartilage whereby the *Processus Styloides* is articulated with the Skull.
- i. Its longest and smallest part.
- k. Its shortest and biggest part.
- l. The Orifice for the *hard Portion*.
- m. m. The Hole for the Jugular Vein and *Par vagum*.
- n. n. The bony part of the *Aqueduct*.
- o. o. The Extremity of the *Aqueduct* where the fleshy part begins.
- p. p. The Hole for the Carotid Artery.
- q. q. The Hole for the *Arteria dura Matris*, and 3d Branch of the 5th Pair.
- r. The middle of the Base of the Skull beneath the Hole for the Spinal Marrow, where the Bone is somewhat raised.
- s. A Depression on the Base of the Skull before the *Choana* begins.
- t. The *Choana*, or Passage between the Root of the Trunk and the Mouth.
- u. A Production of the *Vomer*, or *Septum*, which divides the *Choana* in two.
- x. The Articulation of the *Os Zygomaticum* with the *Os Occipitale*.
- y. The *Glennoid Cavity* for Reception of the lower *Condylus* of the lower Jaw.
- z. The *Sinus* for the Globe of the Eye.
1. The *Os Zygomaticum*.
2. The fore Grinder on the right side.
3. The hind Grinder on the right side.
4. The hind Teeth on the left side, which not grinding at all, only serve as a Wedge.
5. The fore Teeth on the left side, the back-part of which does not Grind.
6. 6. The lower Surface of the Grinders, where their undulate Lines appear.
7. 7. Part of the *Os Maxilla*, where it is articulated with the *Os Zygomaticum*.
8. 8. The great Oval Hole in the *Os Maxilla*.
9. 9. The back part of the *Os Palati*.
10. The Interstice between the the *Offa Palati* on the back-side.
11. 11. The Tusks as they proceed from the *Os Palati*.
12. 12. The two broken off Extremities of the Tusks.
- Fig. 4. represents the Skull saw'd transversely, so that its lower part with the Base appear.
- a. a. The outward Table of the Skull.
- b. b. The inner Table.

c. c. The *Lamina* which pass betwixt the two Tables.

d. d. the Cells form'd by these *Lamina*.

e. e. The Orifices for Vessels which penetrate the *Lamina*.

f. The Seat of the Brain, represented at more length in Fig. 3.

g. g. The two *Condyles* which are receiv'd by the first *Vertebra*.

h. The Hole for the Spinal Marrow.

i. The *Os Zygomaticum*.

Fig. 5. represents the upper part of the Skull saw'd transversely, with the *Cr^u* running betwixt the two Tables and *Lamina* which cover the Seat of the Brain.

Fig. 6. represents the outside of the upper part of the Skull saw'd transversely.

a. a. Two Eminences on the top of the Skull.

b. A *Sinus* betwixt these two Eminences.

c. A long *Spina* in the bottom of the *Sinus*.

Fig. 7. represents the fore-part of the lower Jaw.

a. a. The two *Condyles*.

b. b. The two *Processus Corona* shortened by the opposite view.

c. c. The fore Grinders of the lower Jaw.

d. The distance between the two Jaws for lodging the Tongue.

e. The *Symphysis Mentis*.

Fig. 8. represents the back parts of the lower Jaw.

a. a. Two *Condyles*.

b. b. Two large Orifices of a Cavity, wherein enter the Vessels for nourishing the Teeth, and wherein are lodg'd the *Rudimenta dentium*, as in Fig. 19.

c. c. The two fore Grinders of the lower Jaw.

d. d. The undulate Lines in their upper Surface.

e. The distance between them for lodging the Tongue.

f. The Concave part of the lower Jaw.

Fig. 9. represents one side of the lower Jaw.

a. a. The two *Condyles*.

b. b. The two *Processus Corona*.

c. A Protuberant part of the lower Jaw where the *Rudimenta dentium* are lodg'd.

d. The inner Grinder of the lower Jaw.

e. The outward Grinder, where are represented the Ridges and Interstices of the sides of the Teeth.

h. The *Symphysis Mentis*.

Fig. 10. represents the lower part of the *Processus Petrosus*, wherein are shewn

a. a. A part of the *Meatus Auditorius* opened.

b. The

b. The *Crena* for the *Membrana Tympani*.

c. The *Cavitas Tympani*, endued with several *Cells*, and *Interstices* betwixt them.

d. A Continuation of the same Cavity.

e. The Orifice of the hard Portion of the *Nervus Auditorius*.

f. The ragged Margin of the Bone.

Fig. 11. represents the inner Surface of the upper part of the *Processus Petrosus*.

a. a. The ragged Margin of the Bone.

b. b. The upper part of the *Cavitas Tympani*.

c. The *Foramen Ovale*.

d. A Protuberance, within which is the Cavity of the *Cochlea*.

e. The Orifice for the hard Portion of the *Nervus Auditorius*.

Fig. 12. represents the *Meatus Auditorius* with the *Processus Petrosus*.

a. The External Orifice of the *Processus Petrosus*.

b. b. The *Meatus Auditorius* deriv'd from the *Lamina* above, and running from the outer Table to the *Processus Petrosus*.

c. c. The *Lamina* and *Cellules*, as they proceed from the *Processus Petrosus* on each side.

d. The *Processus Petrosus*.

e. *Orificium Foraminis Nervi Auditorij*.

f. Part of the inner Table of the Skull.

Fig. 13. represents the Bones of the Ear in their proper Dimensions and different Views.

a. The *Malleolus*.

b. The *Incus*.

c. The *Stapes* without the Base.

d. e. The back-part of the *Malleolus* and *Incus* articulated together.

f. The *Stapes* with its Base.

g. The *Malleolus*, *Stapes*, and *Incus* articulated together; whereby is shewn the true distance betwixt the *Membrana Basis Tympani*, and the *Foramen Ovale*, which the Base of the *Stapes* shuts.

h. The Base of the *Stapes*.

Fig. 14. represents the Seat of the Brain enlarg'd, that the Orifices for the Blood Vessels and Nerves may be the more obvious.

a. a. The inner Table depriv'd of the surrounding *Cellules*.

b. b. The anterior *Sinus*.

c. c. The *Os Ethmoides*, with its Eminences, *Sulci*, and *Foramina* for the *Nervus Olfactorius*.

d. The *Crista Galli*.

e. e. The anterior Eminences.

f. f. The Orifice for the *Nervus Opticus*.

g. g. The Hole called the *Foramen Lacerum*, through which pass the *Nervi Motorij Pathetici Ophthalmici*, or first Branch of the 5th and the 6th Pair.

h. h. The 2d Branch of the 5th Pair.

i. i. The third Branch of the 5th Pair.

k. k. The Hole for the *Arteria dura Mairis*.

l. l. The Hole for the Carotid Artery.

m. m. The Hole of the *Nervus Auditorius*.

n. n. The Hole for the Jugular Vein.

o. The Hole for the Spinal Marrow.

p. p. Part of the two *Condyles*.

q. The External Hole for the Spinal Marrow.

r. r. The two middle *Fossa*.

s. s. The *Processus Petrosus*.

t. t. The posterior *Fossa*, or Seat of the *Cerebellum*.

u. The Seat of the *Glandula Pituitaria*.

Fig. 15. represents the *Uterus*.

a. a. Part of the *Ligamenta lata Uteri*.

b. Part of the *Vagina* cut off.

c. The beginning of the Body of the *Uterus*.

d. Divided into two Portions, with an Interstice in the middle.

e. e. Several Eminences representing the External part of so many *Cellules*.

f. f. The *Cornua Uteri*.

g. A loose Membrane wrapt up, that the *Ovaria* below may appear.

h. The *Ovarium* depriv'd of the thick loose Membrane which fluctuates above it.

i. The *Ovarium* covered with the Membrane.

Fig. 16. represents the *Proboscis* cut transversly.

a. a. The two Cavities of the *Proboscis*.

b. The *Septum* which divides the Cavities.

c. c. The tendinous Interfection which runs from before to behind.

d. d. The tendinous Interfection which runs from the Right to the Left.

e. e. e. e. The Insertion of the 4 Muscles into the tendinous Interfection, whereby the Fibres of the one ascend, and the other descend obliquely.

Fig. 17. represents the dissected *Proboscis*.

a. The External part of the Cartilage which surrounds the Cavity of the *Proboscis*, as it arises from the Hole in the fore-part of the Skull.

b. b. That Pair of Muscles call'd the *Levatores Proboscis*, rais'd from above the foresaid Cartilages, with their inner Surface turn'd up, that the Divarications from the Blood Vessels in them may appear.

c. c. The Orifices of the Veins dispers'd in these Muscles.

d. d. The Orifices of the Arteries.

e. e. Their several Branchings.

f. The descent streight along above the Cavity of the *Proboscis*.

- g. g.* The oblique descent of the Fibres of the *Erectores* of the *Proboscis*.
- b.* The tendinous Interfection running down the middle of the *Proboscis*.
- i. i.* The Orifices of the Cavities of the *Proboscis*.
- b.* Its middle part distinguished by several Furrows and Ridges.
- c.* Its lower part, which is hollow, and whereinto both the Blood Vessels that serve for its Nourishment, and a Branch of the Nerve call'd *Maxillaris Inferior*, proceeding from the 5th Pair, enters.

Fig. 18. represents the Extremity of the *Proboscis* cut off.

- a.* A Protuberance arising from the fore-part of the Extremity of the *Proboscis*, and is extended into a Cavity in the back-part *b.* whereby the Animal catches hold of any thing.

Fig. 19. represents one of the Rudiments of the Teeth, which was taken out of the great Hole in the inner side of the lower Jaw, as represented (*b. Fig. 8.*) but much enlarg'd in the proportion.

- a.* Its upper part, which is hard, solid, and white.

A. Represents a Portion of the *Cuticula*, wherein is shewn its inner Surface, and usual thickness; at its Margin at the left hand and lower part are several white lines, which I take to be the Lineaments of so many Blood Vessels; the Pyramids, from whence the Hairs proceed, with the several *Favi* or Depressions.

B. Represents one of the Scabs adhering to the *Cuticula*, where they are thickest.

T A B U L A IV.

Represents the *Vertebrae* of the Neck both separate and conjoin'd, *Ossa Innominata*, *Scapula*, the back-part of the fore and hind Feet, separate Bones of the *Carpus* and *Tarsus*, concave part of the Liver, and *Os Hyoides*.

Figure 1. Represents the fore and back-part of all the seven *Vertebrae* of the Neck.

A. The first *Vertebra* of the Neck with its upper part in Profile, to shew the Holes for the *Arteria Vertebralis*.

a. a. Two Protuberances, which reach on each side to the Skull.

b. b. Two Cavities foreshortned, which receive the *Condyles* of the Skull.

c. c. The two Holes whereby the *Arteria Vertebralis* proceeds from the Skull, and perforates this *Vertebra*.

d. d. Two Holes through which the Artery passes out from this *Vertebra*.

e. e. A *Crena* betwixt the two foresaid Holes, where the Artery is lodg'd.

A. 1. The fore-part of the first *Vertebra* shewn at large.

a. The Hole for the Spinal Marrow.

b. The Hole for receiving the Tooth of the following *Vertebra*.

c. c. Two Cavities for receiving the *Condyles* of the Skull.

d. d. Two Holes for the Cervical Artery.

e. The upper part of the *Vertebra*.

f. Its lower part.

g. g. The transverse Processes, whose Protuberances at the Extremities are represented, A. a. a.

B. 1. The back-part of the first *Vertebra* shewn at large.

a. The Hole for the Spinal Marrow.

b. The Hole for the Tooth of the following *Vertebra*.

c. c. The Cavities which receive the body of the following *Vertebra*.

d. The lower part of the *Vertebra*.

e. e. The Holes for the Cervical Artery.

f. f. The two transverse Processes.

A. 2. The fore part of the second *Vertebra*.

a. a. The forked Extremities of the Protuberance, which arises instead of the *Processus Spinosus*.
b. A

b. A *Sinus* betwixt them.
c. The Hole for the Spinal Marrow.

d. The Tooth which is receiv'd by the first *Vertebra*.

e. e. The two convex Surfaces which are receiv'd into the hind Cavities of the first *Vertebra*.

f. f. The two Holes for the Cervical Artery.

g. g. Two transverse Processes.

h. The lower part of the *Vertebra*.

B. 2. The back-part of the same *Vertebra*.

a. a. The Protuberances of the *Processus Spinosus*.

b. The *Sinus* betwixt them enlarg'd on the side.

c. The Hole for the Spinal Marrow.

d. The Point of the Tooth appearing from the other side.

e. e. The Holes for the Cervical Artery.

f. The concave Body of the *Vertebra*, which receives the convex Surface of the following *Vertebra*.

g. g. The transverse Processes.

h. h. The two oblique Processes which receive the oblique Processes of the following *Vertebra*.

Note, That the five following *Vertebra* are represented by A. B. 3, 4, 5, 6, 7; whereof A. represents the fore-part,

B. the back-part; all the rest of the small Letters showing as follows.

a. a. &c. The Hole for the Spinal Marrow.

b. b. &c. Their convex Bodies, which are received by the concave Surfaces of the following.

c. c. &c. Their concave Bodies, which receive the convex Surfaces of the former.

d. d. &c. The Holes for the Cervical Artery.

e. e. &c. The oblique Processes.

f. f. &c. The transverse Processes.

g. g. &c. The Spinal Processes, which in the fore-part of 3, scarcely appear, but in their back-part appear a little, in 5 arise to $1\frac{1}{2}$ Inch, and in 6 to 3 Inches.

h. h. In 6, 7, are Protuberances, which run back to guard the Cervical Artery as it passes from between the bodies of the *Vertebra*, and quits the Perforation in their transverse Processes.

i. i. Two *Sinus's* in the back-part of the seventh *Vertebra*, which with the like Surfaces in the following make up a Cavity, whereinto the *Condyles* of the first Ribs are receiv'd.

Q

Fig.

Figure 2. Represents the Scapula.

- a. The Head of the Scapula, whereby it is articulated with the Humerus.
- b. b. The two Protuberances on each side of its Head.
- c. The Neck of the Scapula.
- d. A Sinus between the Processus Coracoides and the Neck of the Scapula.
- e. The Processus Coracoides of the Scapula.
- f. The Processus Spinosus.
- g. The Extremity of the Processus Spinosus.
- h. A Protuberance running forward from the Processus Spinosus.
- i. The fore-part of the upper edge of the Scapula.

- l. A thick spongy Epiphysis, which (at the upper edge of the Scapula) was separated by boiling.
- m. The Angle at the back-part of the Scapula.

Figure 3. Represents the lower or fore-part of the seven Vertebra of the Neck.

- a. b. c. &c. The lower or fore-part of the bodies of all the Vertebra.
- b. h. The transverse Processes, which run obliquely forward.
- i. i. The transverse Processes of the 6th Vertebra, running both before and behind to guard the Arteria Cervicalis.
- k. A Sinus in the Body of the seventh Vertebra, for receiving a part of the first Rib.

Figure 4. represents the fore-part of the *Ossa Innominata*.

	Feet.	Inches
A. The <i>Pelvis</i> in Circumference.	4	6
B. The <i>Os Sacrum</i> .		
C. The upper part of the <i>Os Pubis</i> .		
B. C. Between the <i>Os Sacrum</i> and the <i>Os Pubis</i> .	1	6
D. E. From the Right to the Left of the <i>Pelvis</i> .	1	5
C. F. From the upper to the lower part of the <i>Os Ilium</i> .	1	
G. H. Betwixt the two outward Extremities of the <i>Ossa Innominata</i> .	3	6
B. H. From the <i>Os Sacrum</i> above to the foresaid Point.	2	9½
From H. to K.	1	
L. The Circumference of the <i>Acetabulum</i> .	1	6
E. H. Breadth of the <i>Os Ilium</i> .	1	1
M. M. Circumference of the Neck of the <i>Ilium</i> .	1	2
N. N. Breadth of the <i>Os Pubis</i> .		8
O. O. The length of the <i>Foramen Ovale</i> for the <i>Musculus Marsupialis</i> .		5½
P. P. Its Breadth.		4
Q. Q. Its Circumference.	1	1
R. R. The Breadth of the <i>Ossa Pubis</i> before.	1	5
S. T. The length of the <i>Os Sacrum</i> , from whence it is join'd with the <i>Vertebra Lumborum</i> , to where 'tis join'd with the Tail.		

Fig. 5. represents the back-part of the *Ossa Innominata*.

- A. The *Pelvis*.
- B. The back-part of the *Ossa Pubis* at their Articulation, where there is large Cavity.
- C. C. The Oval Hole for the *Musculus Marsupialis* fore-shortned.
- D. The Cavity for the *Acetabulum*.
- E. E. The Margin of the *Os Ilium*, which separated by boiling.

F. The back-part of the *Ossa Innominata*, shewing their Spinal and oblique Processes.

Fig. 6. represents the back part of the Fore Foot.

- a. a. The Bones of the *Carpus*.
- b. b. The Bones of the *Metacarpus*.
- c. c. The *Ossa Sesamoidea*, where of there are two upon the lower Extremity of each Bone of the *Metacarpus*.
- d. d. The Bones of the Toes.

Fig.

Fig. 7. represents the back-part of the Hind Foot.

- a. The *Talus*.
- b. Part of the *Astragalus*.
- c. c. Bones of the *Tarsus*.
- d. d. Bones of the *Metatarsus*.
- e. e. Bones of the Toes.

Fig. 8. represents the Bones of the *Carpus* separately.

- 1. The upper Surface of the External Bone of the first Rank of the *Carpus*.
- 2. The middle Bone.
- 3. The third Bone of the first Rank.
- 4. 6. The upper Surface of the three Bones of the second Rank.

Fig. 9. represents the Bones of the *Tarsus* separately.

1. The upper Surface of the *Astragalus*.

2. The upper Surface of the *Os Naviculare*, much enlarg'd in proportion to the rest.

3. Its lower Surface.

4. 5. 6. The upper Surface of the *Osse Cuneiformia*.

Fig. 10. represents the concave side of the Liver.

a. The *Vena Porta*.

b. The *Vena Cava*.

Fig. 11. represents the *Os Hyoides*.

a. The fore-part.

b. The back-part.

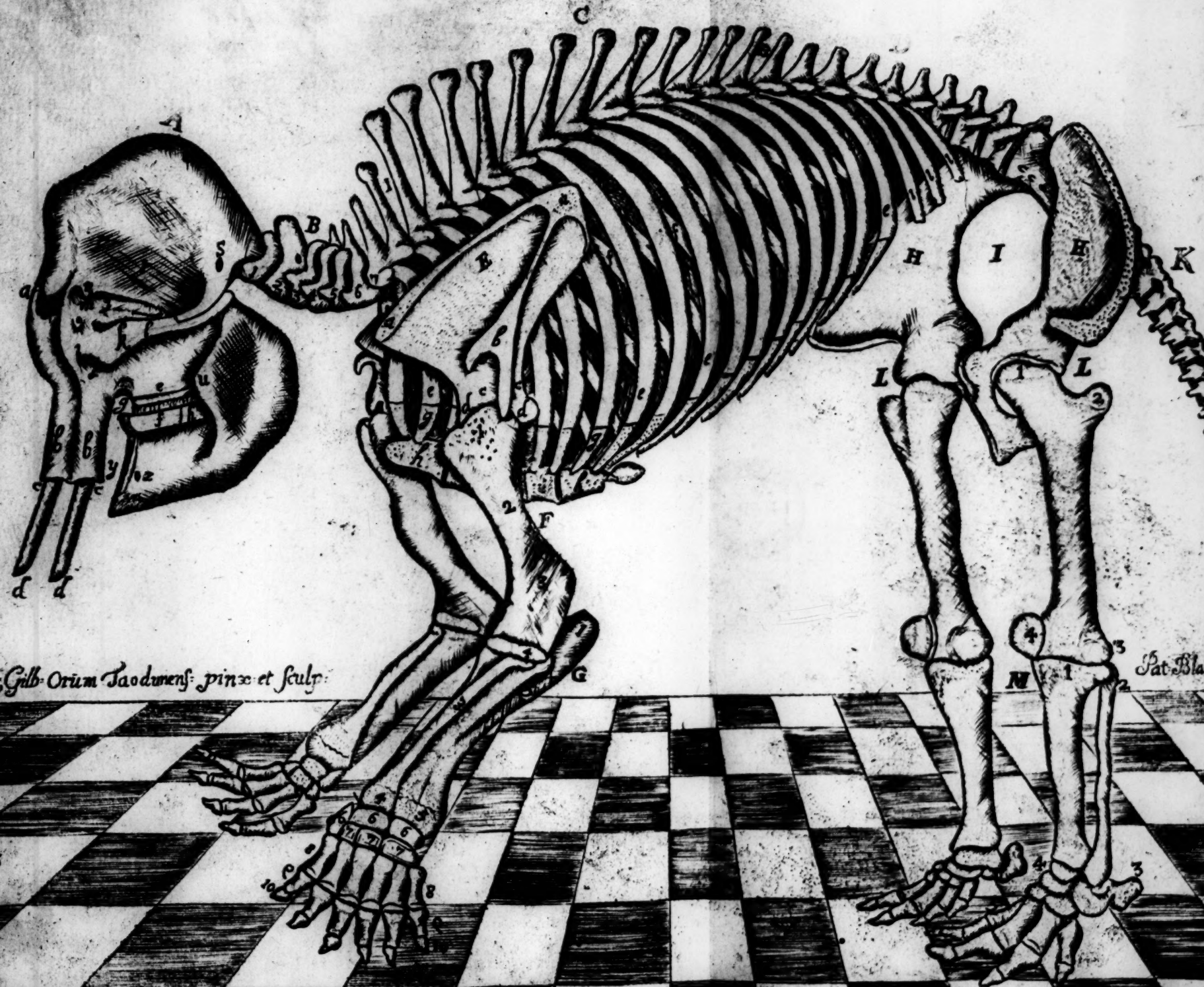
d. d. The *Cartilago Semiformis*.

e. e. The lateral *Osse Hyoidea*.

f. f. The Bones of the Base of the *Os Hyoides*.



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Tab. 2. Imp. Pat. Blair, Gilb. Orum Taodunens. pinx. et sculp.

Pat. Blair

Taodunens. excud.

